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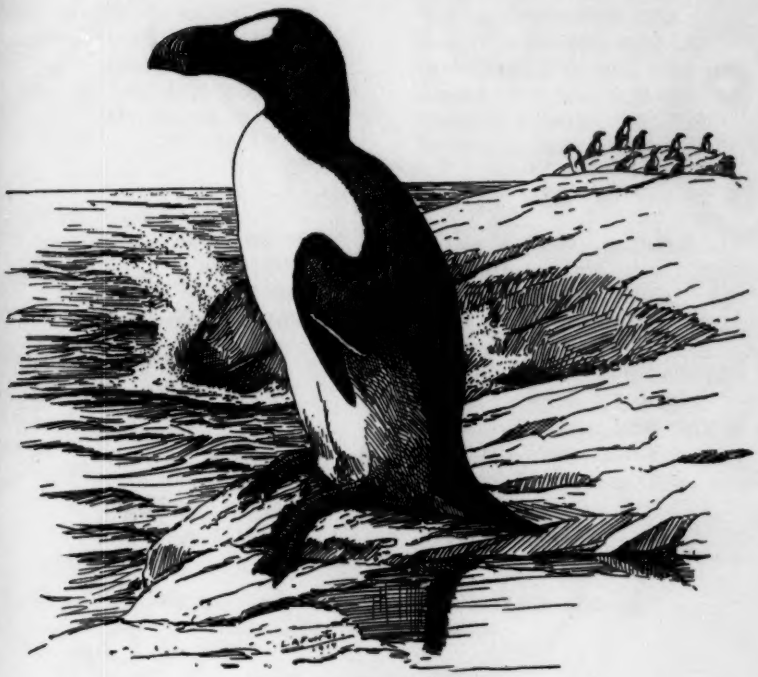

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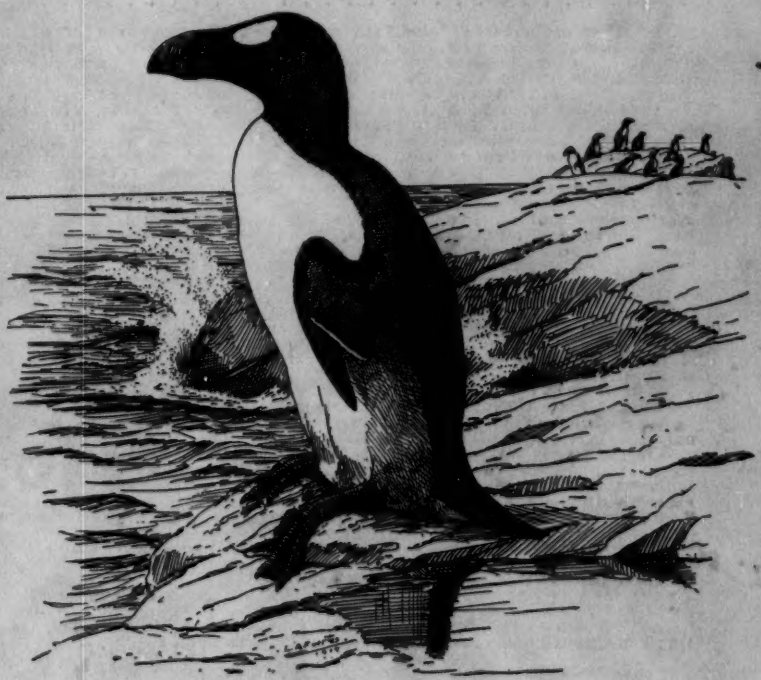

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Photographs by J. E. Crouch.

CEDAR WAXWING.
BOMBYCILLA CEDRORUM.
MALE FEEDING LARVAE TO FEMALE.

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NESTING HABITS OF THE CEDAR WAXWING (*BOMBYCILLA CEDRORUM*).

BY JAMES E. CROUCH.

Plates I–II.

This paper is based largely upon studies of the Cedar Waxwing made in the vicinity of Ithaca, New York, in 1930 and 1931.

These birds may usually be found at any time of the year about Ithaca, though they sometimes disappear for a month or two in winter. This we can blame on their very erratic nature. They are most frequent in open country, in gardens, orchards, and along roadsides where the supply of small fruit is plentiful. It is a common experience to find them along streams catching insects in the manner of Flycatchers. They are common within cities and towns where they feed on the fruits of various ornamental shrubs.

They breed mostly in open country, in orchards, or in the borders of woodlands. They are also found near habitations where they will make use of nesting materials put out for them.

Unlike the vast majority of species the Cedar Waxwings wait until late in the season to start nesting. In Ithaca this is usually about the first or second week in June. I am not prepared to say why the breeding season is delayed. Perhaps it evolved in the far north where it was impossible for them to start earlier, and the habit has been retained.

Their late start results in a rather drawn out season which extends well into September. There is one record in Massachusetts[1] of a brood hatched September 19.

The literature is mute concerning the nesting territory of the Cedar Waxwing. I would judge that it extends no farther than a few feet from the nest itself. At a nest located near the shore of Cayuga Lake, near Ithaca,

[1] Forbush, Edward H. Birds of Massachusetts and other New England States Vol. III, 1929, p. 167.

N. Y., I observed a Cedar Waxwing come within fifteen feet of the nest where it was received kindly by the nesting pair. No attempt was made to chase the intruder away, but the nesting male flew and perched with it on a branch of a nearby tree, and they finally flew off together.

It is doubtful if the Cedar Waxwings have any well-defined feeding territory. If they have, it must be extensive and not defended. Their food supply being either lacking entirely or else abundant, they have never, apparently, developed the instinct to drive out others of their kind. If the food supply is scarce, they move on to other regions.

Although they are sociable birds, it would be wrong to infer that they do not seek any seclusion at all during the breeding season. I have never found two pairs nesting in the same tree, but it is not unusual to find a number of pairs nesting in the same orchard or grove.

The courtship of this species is not as conspicuous a process as it is with many. They develop no striking adornments of plumage, nor do they sing. They have a number of call notes, the most common one, a sort of lisping or hissing note which is used as a signal either to check or initiate the flight of a flock. It may be used as a warning or to attract the mate's attention during the breeding season. There is also a call note described as a "beady" or "blurred" note which is often used. A captive specimen which I had for a year had a very faint attempt at a song of several low notes. This was so low as to be almost inaudible at a short distance. Possibly they do use it in their courtship.

If Cedar Waxwings sing at all, it is not the most conspicuous part of their courtship. We are more likely see a pair chasing each other in wide circles through the air and calling loudly. I have noticed this performance most frequently during the nest-building period.

The so-called "Waxwing dance" is a common courtship activity. Two birds perch close together on a branch and then each hops to the side and then back again. Each time they come together they usually touch bills. This is repeated several times in succession.

Similarly they often pass a berry back and forth between them. The male gets the berry and then comes down by the female. He passes it to her, she gives it back, he usually takes a hop to the side, and then returning passes it to her. I saw this repeated twelve times in succession. At the end the male takes the berry and either drops it to the ground or eats it. I have never seen the female either get the berry or dispose of it. Sometimes we may find several Cedar Waxwings lined up passing berries up and down the line. This is done several times before a berry is eaten by one of them. I have never seen this performance myself, and doubt if it belongs strictly to the courtship period.

During incubation these birds display much affection for each other. In

my studies of the incubating birds at a nest on Turkey Hill, east of Ithaca, I saw them in many cases go through a very interesting performance. It took place when the male had finished feeding the female, whether at the nest or away from it, on a branch of a tree. In some instances the female would pass the last berry or other food back to her mate and he would eat it. Then they would pick at each other's breast feathers with their bills, clack their bills together, or just sit side by side with their mouths wide open. On one occasion the male placed his bill into the mouth of his mate.

The nest is in the majority of cases saddled on a horizontal limb, or less often in a fork. The height varies from four to fifty feet from the ground. It is more usual to find them from five to twenty feet high. Although there are records of Cedar Waxwings nesting in Woodpecker excavations and on lamp posts, these are exceptions rather than the rule.

Nest building is an interesting process. I watched the construction of one nest placed in the forking branch of a willow tree. The birds worked very vigorously both in bringing material and in shaping the nest into form. Although they both carried materials, one bird seemed to do most of the shaping and weaving together of the nest. As nearly as I could tell, it was the female which did this shaping. However, because of the similarity of plumage, it may be that I was mistaken in this observation. Inasmuch as there is contradiction in the literature on this point, it must be studied further. The birds work very close together. They both come to the nest with their bills full of cattail down or small twigs. The male deposits his on the nest and the female then follows with hers. She stays and by much twisting and turning of the entire body and use of the bill, the material is woven into the nest. When this is finished, she calls and is joined by the male, who usually waits nearby, and they then fly off together for more materials.

These birds did not travel far for nesting material, and returned in a minute or two to the nest. The twigs were broken from the branches of a neighboring tree, while the cat-tail down and grasses came from a nearby marsh. When a Catbird and an American Redstart came close to the nest they were promptly driven away by the male bird.

The birds are very noisy at this stage, calling almost continuously to each other. Every so often they would take wide circles into the air and chase each other around, always staying near the nesting tree.

Their approach to the nest was very definite. No matter which side of the tree they happened to enter, the pair would always enter the nest from the south-east side. Cedar Waxwings will desert their nests quite readily during this stage in their life-cycle.

The materials used in Waxwings' nests vary, depending largely on what are available. String, long grasses, and plant downs of various kinds are

almost always found. Other materials such as cotton, rootlets, weed stalks, pieces of cloth, twigs, plant fiber, horsehair, dead leaves and shredded bark are also common. Very often long pieces of string will be attached to the nest. (Plate I, fig. 1.)

The measurements of a typical Cedar Waxwing's nest are as follows: outside depth, 4–4½″; inside depth, 1–1¾″; outside diameter, 4½–5″; inside diameter 3–3¼″; and thickness of walls ¾–1¾″.

The nest is completed in five to seven days and egg laying starts immediately. The number of eggs varies from three to six, the usual number being four or five. I found five in each of the nests I studied. One egg is laid each day until the complement is completed, and incubation starts at the laying of the first egg. Regardless of this fact they all hatch at the same time.

The birds are usually very silent during the incubation period. They call very seldom, and come and go from the nest without notice.

On July 23, 1930, I located a nest at Turkey Hill, east of Ithaca. It contained two eggs, and the bird was incubating them. I visited it each of the next three days, being careful not to alarm the bird. Each morning I found one more egg in the nest, the total being five. These eggs were laid before eleven in the morning.

This nest was located very conveniently for photography. It was placed on a horizontal limb of an apple tree about six feet from the ground. Therefore I was very careful in my observations not to alarm the birds and cause them to desert. From the start they were not very timid.

I erected a platform and on it placed a blind. This was about four feet from the nest, and was readily accepted by the birds. Everything was ready now for close observation. I was able to distinguish the sexes without much trouble. The incubating bird had much less black on the throat than the other, which meant that without doubt it was the female.

The ready acceptance of the blind by the birds and their disregard for what might take place inside made photography and observation comparatively easy. The male bird was more timid than the female. He would not approach the nest unless I was silent, while the female came even though I was moving about and making considerable noise. This difference in the development of instincts in the two sexes was interesting.

Incubation was performed entirely by the female. The activity during the entire period did not change to any great degree. The female was fed by the male for the most part. (Plate II, fig. 2.) Sometimes he came directly to the nest, but more often he appeared in the top of a dead tree about one hundred feet from the nest. He would give his call and she would go quickly from the nest, sometimes uttering a peculiar peeping call. At other times she would look nervously around, give her peeping call, and either go off or

Photographs by J. E. Crouch.

CEDAR WAXWING.

BOMBYCILLA CEDRORUM.

UPPER: YOUNG BIRD AWAITING PARENTS WITH FOOD.

LOWER: MALE FEEDING BERRIES TO INCUBATING FEMALE.

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stay on. If she stayed on the nest, the male would at times come there and feed her, or else fly off and not appear for a period of ten or fifteen minutes. When he came to the nest he was very cautious. He usually came to the opposite side of the nesting tree, hopped from branch to branch, and finally up to the nest, where he fed her. The food given at this time was in the majority of cases choke cherries and wild black cherries. Once in a while as shown in Plate I, fig. 1, insects were fed.

After feeding the birds would very often show their affection for each other by touching bills, ruffling each other's breast feathers, sitting with their bills wide open, and clacking their bills together. The last cherry given to the female was sometimes passed back and eaten by the male, as mentioned before.

The method of leaving and entering the nest was very definite. In leaving, the bird often went so suddenly that one hardly knew it. In coming back she had a very definite route coming through the trees, hopping from branch to branch until she reached the nest.

The length of time which the female stays off of the nest varies from three to ten minutes, normally. More often she comes back in less than five minutes. If she stays away more than ten minutes, it is usually because she has been startled.

The position of the bird on the nest is very definite. She keeps her back to the sun. In the morning when I would first visit the nest she would be facing the northwest. As the day progressed she would keep turning, and at night one would be almost sure to find her facing north or northeast. This was true at Camp Barton also, where I made observations.

On very warm days the Cedar Waxwing pants persistently. It does not fluff out all of the feathers of the body to the extent that many birds do, but merely lifts the crest. The body feathers lie loose. If one should make a noise in the blind at this time the feathers would be pulled tight to the body, the bill closed, the crest lowered, and the head lifted straight into the air. This position would be held until danger passed. I once made a noise in the blind just as the male had reached the nest to feed the female. He stopped perfectly still, fluffed out his feathers, erected his crest, and leaned on a branch by his side. He held this attitude until I had taken three pictures, and then flew away. Here we have two means by which this bird attempts to blend itself with its surroundings. (Plate I, fig. 2.)

On August 7 the female's incubating instinct was at its height. She flew off the nest when I tied the limbs back for photographing, but came back almost immediately. I wanted to photograph the eggs, and so I waved my hand out of the front of the blind and had almost to touch her before she would leave. Again she came back without hesitation. From this day until the eleventh of August her instinct waned. The male came even less frequently to the nest, and on August 12 I found the eggs cold and deserted.

Another nest at Camp Barton, a boy scout camp near Ithaca, also presented interesting information. It was located in the center of a clump of sumach about ten feet from the ground. The particular sumach in which the nest was built was dead, but covered densely by grapevine. The nest site was almost entirely surrounded by paths which were used by the scouts. The birds, however, did not seem to mind this in the least.

The story of what took place here was much the same as with the Turkey Hill nest, but there were a few points in addition which are worthy of mention.

The relations of the Cedar Waxwing to others of its species and to other species was interesting. They always seem to be friendly. While I was watching the birds on July 15, another Waxwing made its appearance. It happened that the female was off the nest at that time, and instead of there being a fight, as one might expect, there was nothing of the kind. The female merely flew quickly to the nest and covered the eggs, while the other two birds sat on a branch about eight feet away. This same procedure is followed when other species come close to the nest. A Catbird approached to within two feet of the nest one day. There was no fight. They merely flew at him, and one bird went on the nest. The other sat close by for a few minutes and then flew off. Similarly, a Chickadee visited the nest and hopped right into it and picked around. The owner came onto the nest directly, but did not chase the Chickadee away. He stayed within a few inches of the nest, peering about with curiosity.

Most authorities state that incubation is shared by male and female birds. While this is undoubtedly true in many cases, it is not always so. In both nests which I studied the female did the incubating. Mr. William Gross, who studied the Cedar Waxwings in Michigan,[1] found that the female did all of the incubating at one nest, while both birds incubated at another.

The eggs hatch in twelve to sixteen days. The birds deserted the nests which I studied, so I have no data on this part of the life cycle. Desertion is very common and easily brought about in the Cedar Waxwings. This is especially true at the beginning of any one phase of the life-cycle, such as at the beginning of nest-building. With my birds the eggs did not hatch on time, probably because they had been chilled at some time. When the normal period for incubation ended, the instinct to incubate waned, and therefore desertion followed.

The Cedar Waxwings being altricial birds, they are hatched blind, and helpless. They develop very rapidly, their eyes opening on the third day. Their senses of hearing and touch are apparently well developed, as shown by their response when you touch the nesting tree or make a sound near the

[1] Gross, William. Bird Lore, Vol. 31, 1929, p. 178.

nest. They raise their heads and open their mouths wide in their desire for food. In a period of two weeks the young have increased twelve-fold in weight, and have developed keen senses and instincts. While they are naked at hatching they have now become fully feathered, and are ready to fly.

My only first hand observations on young Cedar-birds in the nest were at Camp Barton. I found this nest on July 11, 1930. At the time one of the old birds, apparently the female, was sitting on the edge in a very erect position. She retained this pose when I sat on a ladder about five feet below her. Finally, however, she flew into some tall weeds about ten feet away. She then fluffed out her feathers and with a queer zig-zag motion flew along the ground and went into a nearby willow. She seemed to be trying to lead me away from the nest.

The birds refused to come back to the nest until I had hidden myself about fifty feet away under a large willow. They then came and fed the young. They fed first one and then another at one visit, and the average length of time which they were away after food was twelve minutes. They always brought back about eight or ten berries.

At each feeding the nest was usually inspected and the little sacks of excrement were removed. Sometimes the bird dropped them over the side of the nest, but more often swallowed them.

On July 13 the young were becoming very active. They would stand up on the edge of the nest and flap their wings vigorously, preparing themselves for their first flight. The next day they were taken from the nest and banded, but when put back again they stayed and made no attempt to leave. On the fifteenth I took them from the nest and attempted to photograph them. I placed them on a stick and made a couple of exposures. I then tried to get the parents to come and feed them, but in this I had no success. They would fly up very close to the young and call, thus leading them away, and it was impossible to take any more pictures.

I put them back in the nest again, but they would not stay. They flew in various directions, and I did not see them again, although I am quite sure they stayed close by and were fed by their parents for several days. I could hear them calling as I passed near the nest.

The Cedar Waxwing usually has two broods in a season. It is quite probable, however, that they may sometimes have as many as three.

After the nesting season is over they form large flocks. These are made up of old and young alike and go about the country searching for food. In the vicinity of Ithaca we are most likely to find them where the wild black cherries or choke cherries are abundant. Or they may be found along the streams where they fly out and catch the insects which swarm over the water. Later they are joined by other Cedar Waxwings which have prob-

ably nested farther north, and they wander about in these large flocks until October and November, when many or all disappear. It is not unusual however to see flocks of Waxwings, during the winter months, feeding on barberries or other berries even though the ground be completely covered with snow.

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WINTER LIFE AND NESTING STUDIES OF HEPBURN'S ROSY FINCH IN WASHINGTON STATE.

(PART I. WINTER)

BY WILLIAM T. SHAW.

Plates III–IV.

Introduction.—As the title of this paper would suggest, the study is divided into two parts. The first deals almost exclusively with observations made upon the bird at Pullman, Whitman County, Washington, the near-by Snake River Canyon and the Cedar or Moscow Mountains, of Latah County, Idaho. The second part[1] of the paper deals primarily with the nesting of the bird, upon and beside the glaciers, in this case, chiefly of Mount Baker, Whatcom County, Washington.

In respect to topography and floral covering, the Pullman area is a Transition Zone plateau with an elevation of about 2500 feet, consisting of volcanic ash originally covered with Bunch Grass (*Festuca*) now given over to the raising of grain with its occasional unkempt areas of weed patches and neglected, brushy fence rows. That of the River, near Lewiston, Idaho, at the junction of the Snake and Clearwater Rivers, might be described as an Upper Sonoran Zone weathered into a broad canyon with an elevation of about 650 feet, with here and there, precipitous, erosions of lava flows, forming winter shelter for the birds. The third or mountain area, Transition to Canadian merging into Hudsonian in zonal aspect, having an elevation of approximately 5000 feet, covered with Douglas Fir (*Pseudotsuga taxifolia*), White Fir (*Abies grandis*), Larch (*Larix*), Lodgepole Pine (*Pinus contorta*), and Arbor Vitae (*Thuja plikata*) with an undergrowth of Snowbrush (*Ceanothus*) and Alder (*Alnus*). This latter area seems to be used locally by the Rosy Finch, as an intermediate region in gaining altitude on its way to its nesting grounds around and above snowline on the higher mountains and conversely, in returning in the autumn, as no doubt similar elevations are used for like purposes.

My first observations upon living Rosy Finches were made at the Campus of the Washington State College, Pullman, in February 1906. Two kinds were found, the Hepburn's (*Leucosticte tephrocotis littoralis*) much the more abundant and the Gray-crowned (*Leucosticte tephrocotis tephrocotis*) which was comparatively rare. Local records bore evidence that recognition of these birds had already been made as shown by the Museum collections of the Washington State College where were found skins of both, bearing the following data.—Three skin specimens of the Hepburn's Rosy Finch

[1] To appear in 'The Auk' for April 1936.

(*Leucosticte tephrocotis littoralis*) a female, March 15, 1897, a male December 27, 1897 and a female March 15, 1899,—all collected by S. E. Piper, at Pullman, Whitman County, Washington. Of the Gray-crowned, (*Leucosticte tephrocotis tephrocotis*) one, a male was collected by S. E. Piper, February 4, 1898, at Pullman, Washington. The last named specimen stands, to the best of my knowledge as the first record of the Gray-crowned Rosy Finch for the State of Washington. In addition, the Washington State College Museum possesses, among the early dates, one mounted male *Leucosticte tephrocotis tephrocotis* collected November 25, 1908, by Clarence M. Keyes.

To my great delight and satisfaction it was soon found that the Rosy Finches would respond nicely to food placed upon the window-sills of the Museum office, while still retaining their spirited wild natures. Here they returned, year after year without interruption until 1925 at which time the writer became non-resident and the observations were more or less given over, and ended for me, in the winter of 1927. Fortunately for my studies of this most interesting life history it was now possible to devote attention quite directly to a study of the nesting of the birds in the high mountains, especially in the Mount Baker-Shuksan Region, Whatcom County, Washington, in the northeastern corner of the State, a short distance from the British Columbia Line.

Migration.—Usually the birds, being winter residents at Pullman, did not arrive at the Campus much before the first of November. On two years they came on the same date, October 28, and one year, 1922, on the 29th of that month, being seasonally, a few hours late; the main flock of about 25 birds did not appear until November 18. Three years in succession they were first seen in the community, at their feeding box on the window sill on the dates of October 29, 1922, November 15, 1923 and November 12, 1924. On November 6, 1926, one lone bird was seen flying across the summit of Moscow Mountain, chirping the call note, at a time before they had arrived at Pullman, with its lower elevation. Usually in these late autumn days their numbers were few and it was not until the snow storms of December had settled down or the sharp zero weather of January struck, that they came in numbers to accept my window-sill hospitality and that of friends about town who were interested in their welfare. When once established, however, they remained rather constantly until the sunny days of spring gradually called their flocks, to fade away towards the lands of perpetual snow and ice. The latest record for departure from Pullman was March 26, 1921, although they were twice observed near the summit of Moscow Mountain on April 14 and May 11, 1923.

Winter activities.—The Rosy Finch although spirited and more nervous of temperament than the Purple Finch (*Carpodacus*) is very tame and con-

fiding and in the winter range will respond well to help provided for them in tiding over periods of storm. They are attracted by the shelter of old buildings, especially if food exists in the neighborhood. A winter walk into the country on February 4, 1923, revealed a large flock congregated in and about the barns and houses of an unoccupied ranch. They seemed as much at home around these old buildings, which were largely window- and door-less, as they were outside upon the roof,—perhaps more so, for here on the day before, a small Hawk was seen in the trees of the dooryard. A Finch was noticed going into a knothole with perfect ease, as if it had gone into like small openings before. They were even Wren-like in their manner of investigating small crevices. In the old house, they were observed fluttering about upon some wheat grain samples suspended from the ceiling, and upon my entering, seemed to prefer to remain where they were, to dashing outside to take chances. So much were they at home in the buildings on this occasion that two seen perched on the branches of a tree outside looked odd. In fact, so much are they ground- and rock-inhabitors that it seems strange to see them alight upon trees and this action appears to be chiefly for purposes of reconnoiter. Usually they select the dead tops of trees or the living crowns of growing conifers for observation points seldom entering the lower branches as a Junco would. Twice were they noted specifically perched on dead tree tips on the summit of Moscow Mountains and likewise, almost daily, on the moraines bordering their nesting grounds on Mount Baker.

Continuing my rambles on this same occasion, farther into the country beyond, signs of the Rosy Finches were found in abundance. An extensive wheat stubble field, showed here and there through the light snow covering, heads which had sprouted and which had been picked to pieces by some animal. Great networks of tracks were found in the snow and these were probably due to Rosy Finches. The tracks were also very numerous about the neglected fence rows, where wind-driven mustard had lodged. Beyond, at an occupied ranch, the situation was much the same, with birds everywhere—in and out of the buildings. The rancher, William Jarron, a friend of birds, called them "gray-headed birds" and said they had been more abundant this year, about his buildings, than he had ever seen any other bird in the country before. They were indeed very numerous, the snow-free spaces beneath the header boxes being quite covered with them and at times they extended all over the barn yards.

Yet with all this friendly association with man, they are more commonly found in remotely-isolated places even in winter, and in summer say a long good-by to ordinary human relationships. Rather remotely distant from Pullman, they have been observed on our trips into the Moscow Mountains at various times during the winter and late spring as above mentioned.

Yet on these occasions they were never noted in the denser wooded areas, but where recorded were seen in the grain-bordered foothills or in the more open areas of the summit. In their Snake River winter habitat they are becoming celebrated for the interest of their roosting grounds along the basalt cliffs.

Daily activities.—The Rosy Finch during the winter months is quite decidedly diurnal. On December 31, 1922, they were heard distinctly, and many times shortly after daylight, at our winter camp on Moscow Mountain at an elevation of 4000 feet. They appeared to be associated with the tall, scattered, fog-obscured fir trees and may have been refugees from storm, though they might have been attracted by the chaff scattered about the feeding boxes of our horses. This habit of stirring about early in the morning hours was also noted at the office window feeding tables. They were correspondingly early in congregating for the night. This habit was observed about the buildings and also at one of the cliffs on the Snake River, known locally as Swallow's Nest Rock, near Asotin, Washington. On January 29, 1927, the writer conducted a party from Washington State College, consisting of Drs. Webster and Leffingwell, Messrs. Putnam and Gibson on a visit to these rocks. It was about three in the afternoon and the birds were coming together in preparation for their nightly assemblage. They were in greater numbers than I had even seen them around the rock before, and were an object of unusual admiration to the members of the party. Perhaps the size of the flock was due to the time of day and their homecoming for the night—for here were their nightly retreats all ready for use—the old forsaken last summer nests of the Cliff Swallow (*Petrochelidon lunifrons lunifrons*) now far away in the southland. They were fluttering all over the cliff face at times, again diving off into spirited undulating flight, wheeling in the air, on wings suggestive of muscular power, to fly directly back at the perpendicular face of the rock like wind-driven snowflakes, and like them avoiding sudden contact and destruction by shooting skyward over the brow as if sucked up by unseen currents of air. Again they would settle on the sandy tallus-like slope in an eager effort to feed, against the coming of night. Nearly all were Hepburn's and only two Gray-crowned were seen, out of a flock conservatively estimated at 200 birds. An occasional bunch of Finch feathers among the Russian Thistle and tufts of grass at the rock base, together with a feather of Macfarlane's Screech Owl (*Otus asio macfarlanei*) suggested a possible tragedy. Finch feathers were also noted once near their nightly shelters at Pullman where Screech Owls were known to be dwelling. Other birds of prey may have been interested, although only once was a diurnal raptor seen, a Prairie Falcon (*Falco mexicanus*) which soared out from the cliff crest. Perhaps winged enemies are, for them, the most common and the most to be feared. The main flock, on

Photographs by W. T. Shaw.

HEPBURN'S ROSY FINCH.

LEUCOSTICTE TEPHROCOTIS LITTORALIS.

UPPER: ROOSTING IN OLD CLIFF SWALLOW NESTS.

LOWER: FEEDING AT BASE OF SWALLOW NEST ROCK, WASHINGTON.

UNIV. OF MICH.

returning to Science Hall, November 18, 1922, seemed to show mistrust for the flapping awnings which had been added above the windows since their departure in the spring. On February 5, 1927, I returned to Swallow's Nest Rock for a camp of seven days. The birds seemed a trifle less abundant than they had been on January 29. Again the old unused nests of the Cliff Swallows were the chief center of attraction, and the cliff face was a scene of animation, as the great wall was thrown into shadow by the receding sun. Photographic exposures were made of the birds in and about the nests and on February 12 an exposure was made on a spot where some wheat tailings had been scattered by the roadside, a space about four by six feet. Upon the resulting negative about 60 birds were included. This wintering at a comparatively low elevation of 650 feet would seem to us unusual, but probably their chief interest in coming here was to spend the night warmly, as they were not common in the morning, probably having gone to the upper stubble to feed during the day.

Numbers and relative abundance of species.—In regard to the abundance of the birds and the relative numbers of each species occurring in this part of the state, the opportunity offered for close-up counts at the feeding box was exceptional. On five occasions, November 18, 29 and 30, 1922 and January 27 and February 11, 1923, flocks of 25, 20, 39, 46 and 33 respectively were counted upon the window-sill. Of these, the Hepburn's was by far the more abundant. Three close window-sill observations aside from those cited above at the Swallow's Nest Rocks, January 29, 1927, gave 1, 1 and 2, individuals of the Gray-crowned to 20, 45 and 31, of the Hepburn's. In 1921, *tephrocotis* was not seen at Pullman at all. In contrast to the large flocks of 1922–1923, no Finches were seen at Pullman, during the winter of 1926–1927 and it was also said that they did not appear at all during the winter of 1925–1926, at which time the writer was absent. These, to my knowledge are the only years between 1906 and 1927 inclusive in which they did not appear on the Campus. This break in their regularity of appearance was probably due to the fact that their old feeding box had been discontinued during these years, although it may have been influenced by a waning cycle, from their abundance in the years of 1922–1923.

Feeding Activities.—Rosy Finches are primarily ground-feeders, and I cannot recall having seen them show any signs of feeding upon buds or fruits of trees as some of the House Finches (*Carpodacus*) are apt to do although one might expect them to do this at certain times of the year. That they reach for ripe seeds from low growing plants is probable. Nor have I seen them use the feet in scratching, as some of the ground-feeding Sparrows (*Passerella*) are wont to do in turning over dead leaves and other debris. On the other hand, the Rosy Finches have a dexterous side sweep of the beak which is very effective in securing food from both soil and snow. At Snake

River they were observed February 5–12, 1927, gleaning among the weeds, Russian Thistles (*Salsola*) and low-growing Cactus, presenting a pleasant sight, and showing their dexterity and method of looking for seeds. They also practice a trick, which consists of a sudden side-sweep of the sand with the beak, and which they also employed in sweeping away the snow from their feeding box.

At the Campus, much of the winter day was spent at the feeding box. On bright days only a few birds might appear, feeding and gleaning leisurely through the sunny hours. At such times of plenty they would indulge in mild combats,—the one in possession of the window-sill defending its territory valiantly. With mouth wide open and all body feathers on end, wings and tail strutting, it would go through threatening attitudes, hopping stiff-leggedly and rapidly back and forth over its territory, as a last resort dashing into the air to repel an oncoming adversary. This dog-in-the-manger attitude was also shown in the defense of their right to possess one entire abandoned Swallow nest. But let the wild seeds of the earth be hidden by a light skift of snow, or a wintry gale from the southwest blow up, driving sleet and rain before it, then all animosity expressed in these mild duals was forgotten, and they came piling in until the sills would hold no more, and it was a sight to see the attention concentrated upon their food. Yet they are a brave resistant winter bird. They seem not greatly to mind severe protracted storm and one sometimes sees them swept clear off their feet by a terrific blast of snow-ladened wind. Occasionally on days of half rain and half snow the Rosy Finches looked quite bedraggled, and the feathers about the head became quite water-matted toward evening. After the storm, when sunny days came again, one learned much of their methods of retrieving food. For now, they proceed leisurely to gather that which was hidden by the snow. Persistently they work down through the frozen sleet, side sweeping with their efficient beaks sending the crystals flying out latterally for eight or ten inches. In this way they sometimes open up small pits in the snow as much as two inches in diameter by one inch deep. During such operations, one sometimes sees them pause to eat a few crystals of snow, manipulating the flakes for a few moments in the beak until they melt and pass back as water into the throat to be swallowed.

At all times they were attracted by bird seed such as is used for the tame Canary. Not all of this seemed to their liking, but the discus-like Hemp seed appealed especially to their taste. Seizing one of these, they would manipulate it rapidly until its sharp edges were caught between the upper and lower mandibles and alternately pinch and roll with the tongue until the seed hull snapped and flew into pieces. That their economy as destroyers of wild weed seeds is beyond question has been carefully shown by the Leffingwell studies (Condor, 1931).

Seasonal Color Changes.—As the generic name *Leucosticte*, which means "varying white" (Coues, 1903) would imply, the bird is subject to slight variation in color of plumage as shown at different seasons. Upon their arrival in October and November their plumage was rather typical of the species. The mature males wore the characteristic deep cinnamon brown, with black forehead and chin, gray head and upper neck except for *tephrocotis* where the cheek was brown. A varying amount of white suffused the otherwise blackish wings. The tail and feet were blackish. The rose was found chiefly on the rump and flanks. Here, especially on the distal ends of the feathers of the flanks, is shown, in response to intense cold or again to the warmth of sunny spring days, a lovely display of individual rose-pinkish spots, produced by the elevation of each separate feather. Such flaunting on sunny spring days is often accompanied by an animated strut and exuberance of spirit leading towards a twittering, modest nuptial song of unusual pleasantness. The female is similar in color but duller. Young of the season, in early winter, are still duller in plumage, though much clearer in tone than the plumage worn at the time of leaving the nest. A point of special interest is the color of the beak. In winter it is typically bone color, in summer ebony in strong contrast to the light gray nasal tufts. That this change of color is gradual is quite noticeable.

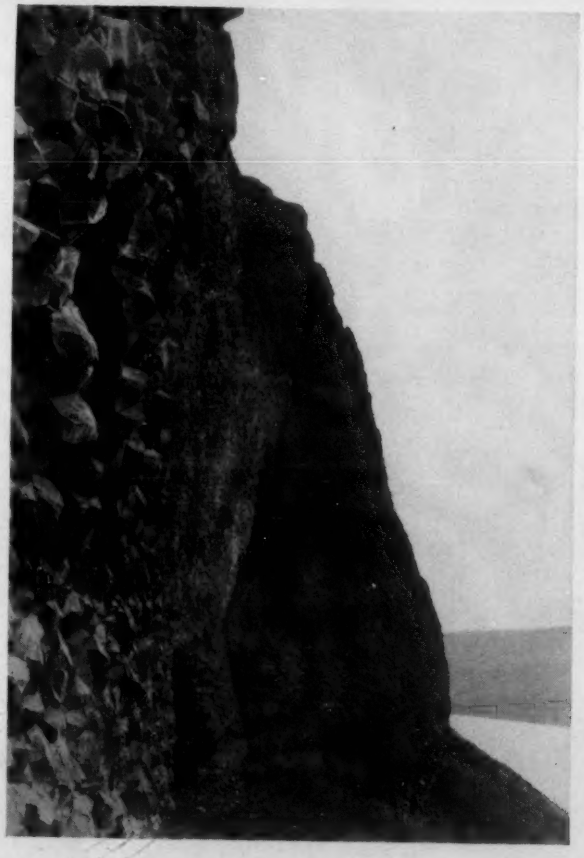
On November 15, 1923, a bird just arrived had the beak ebony or nearly so but by December 11 it was quite typical bone color of winter. On March 26, 1921, on the day of their last appearance at Pullman, the beak of *L. littoralis* was decidedly grayish black. One *L. littoralis* wearing a distinct brown patch on one cheek appeared at the window in the autumns of both 1922 and 1923. It remained all fall in 1923 and seemed not to be pure *L. littoralis*, as it had this brown patch coming up on the side of the cheek in a ragged line.

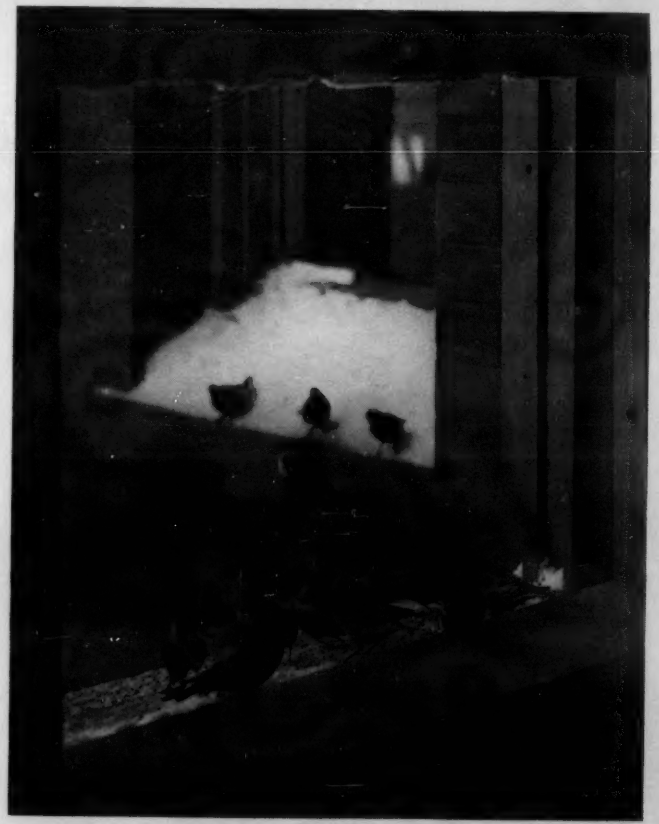
There came a time in early February when the colors of the birds began to brighten. On February 4, 1924, it was noted, that quite suddenly during the two or three sunny days around this date, the gray heads of *L. littoralis* became noticeably lighter. During the next four or five weeks they became more daintily tinted with pinkish and white than I have seen them at any other season, for in their nesting ground, at least from the 15th of June on for a month, the plumage has dulled considerably. With this brightening of color is associated the employment of a gentle twittering of song and a tendency to strut, especially on bright warm days; such inclinations of song and actions in February are forerunners of the same in the nesting grounds.

Voice and Song.—The most pronounced characteristic of the voice of the Rosy Finch is a distinct, fairly loud call note "*weep-weep,*" very suggestive of the English Sparrow (*Passer domesticus*). This is uttered when the bird is slightly alarmed or it may be given a moment or two before departure,—

a sort of rally for the flock. It would seem to be used in this way as it is more frepuent in the winter than in the summer. Another call note of less alarm is a deep, "*pit-pit,*" uttered once or twice. While both of these may be given when on the wing there is a third twittering song employed more commonly during flight. These twittering notes are usually heard in both winter and summer ranges and are likewise used when the bird is perched on the rocks just prior to beginning the food search, or before leaving the same employment, at which time it is often accompanied with a flashy twitching of the wings. There are however, some characteristics in which the bird's summer voice differs from the utterances in its winter habitat. In its nesting grounds, almost always just before it alights upon the moraines from an extended flight, it utters a harsh "*t-z-z-z-t,*" while still in the air, and when taking flight, in the nesting grounds after a long spell of gleaning, it utters on dull days, a well-spaced "*didt-didt,*" staccato, harsh and lonely, with a pleasant "*twit-twit,*" on sunny mornings. With their long, undulating flight over the snow fields of their nesting grounds they frequently utter "*tid-bid-tid-tid-bid.*" All in all, however, the Hepburn Rosy Finch is not very vociferous, when compared with a Purple Finch (*Carpodacus*). Occasionally one will give a few pleasant, spirited notes, as of a song, even in mid-July momentarily varying the sharpness of their call notes.

1002 Cambridge Ave., Fresno, Calif.





Photographs by W. T. Shaw.

LEFT: SWALLOW-NEST ROCK, ON SNAKE RIVER, NEAR ASOTIN, WASHINGTON—A VERTICAL BASALT CLIFF.
RIGHT: HEPBURN'S ROSY FINCHES FEEDING AT WINDOW OF WASHINGTON STATE COLLEGE.

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SOME SIXTEENTH CENTURY PAINTINGS OF AMERICAN BIRDS.

BY ELSA G. ALLEN.

Plate V.

IT augurs well for the progress of ornithology in America that a weight of interest has been placed of late years upon the history of the science, not only by way of careful delineation of its modern development, but also in attention to the foundational work of pioneer naturalists. New details in the lives and labors of those earnest workers, Catesby and Wilson, are gradually being added, and recent historical papers point to even earlier beginnings of American ornithology.

Such is the interesting account given by Bayard Christy[1] of an old manuscript by the English clergyman, Edward Topsell, entitled 'Fowles of Heauen,' now housed in the Huntington Library, San Marino, California. In the account of the Fiftieth Meeting of the A. O. U.,[2] we read that "The manuscript [Topsell's] dates from 1613 or 1614, six or seven years after the founding of Jamestown, and so far as known is the earliest list of American birds."

A number of years ago I became very much interested in the history of early American ornithology, and through the writings of the American scholar and bibliophile, Henry Stevens of Vermont, I learned of the existence in the British Museum of certain water colors of American birds, plants, and other natural history subjects which antedated Topsell's work by from twenty-five to thirty years.

Topsell's work, 'Fowles of Heauen' is primarily a treatise on European birds, but it lists seventeen American species which in various ways had become known to the author, although he never visited America.

The subject of the present paper, in contrast to Topsell's account, represents work, done in America, by a painter, one John White, also called John With,[3] who, as artist and draughtsman, accompanied Sir Thomas Hariot in 1585 on that ill-starred expedition sent out by Sir Walter Raleigh to found an English colony in America. He was chosen by Queen Elizabeth for the express purpose of studying and painting the aborigines and "natural products" of this far country.

John White thus becomes the first man, so far as is now known, to observe American birds in their native haunts, and to leave a pictorial record in colors of his observations.

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[1] The Auk, July, 1933, pp. 275–283.

[2] T. S. Palmer, The Auk, January, 1933, pp. 66–67.

[3] Edward E. Hale, American Antiquarian Society Proceedings, April 25, 1860, referring to the artist John White, says, p. 47, "John Twit, John With, John White and John Whyte, are all the same person."

A synopsis of the story of these paintings made during his first expedition to Virginia[1] may be found in the 'Bibliotheca Historica,' by Henry Stevens, Boston, H. O. Houghton & Co., 1870, pp. 222–226. Here we read (op. cit. 224) "In the year 1865, John White's original water colors, made for Sir Walter Raleigh in 1585, fell by purchase into the hands of the writer [Henry Stevens], and in March, 1866, fell into the right place in the Grenville Library in the British Museum, at the moderate cost to the Trustees of £236, 5s. 0d.[2] They now are a prominent part of the world-renowed Grenville De Bry 'Voyages'. A glance at the drawings will show that they are the work of an artist, and portraits—whether of men, women, animals, fish, fowls, fruits, or plants."

During the winter of 1934–1935, while studying in the British Museum, I took opportunity to enquire for these John White originals, and was delighted to find that they were on exhibit as samples of Elizabethan Art.

Through the courtesy of Mr. Eric O. Millar, Deputy Keeper of Manuscripts, who had informed me of the transfer several years ago of these drawings from the Department of Manuscripts to the Department of Prints and Drawings, I was permitted to study carefully these early samples of bird art, and through the kindness of Mr. A. M. Hind, Keeper of Prints and Drawings, to have several photographic copies made from them, two of which are herewith reproduced.

There are three albums of these John White drawings, the first of which bears the following identifying title and number: "1. John White's Original Drawings in Water Colours, 1585 Case 199, No. a. 1."

On the first page the following inscription appears: "From Lord Charlemont's Library, sold at Sothby's August 11, 1865, 769, 228, for £125." Below is the name "Grenville."

There are also pages cut and pasted in from Stevens' description of Sir Thomas Hariot's 'A Briefe and true Report of the New Found Land of Virginia,[3]' which establish the authenticity of the manuscript and recount the story of its sale in 1865.

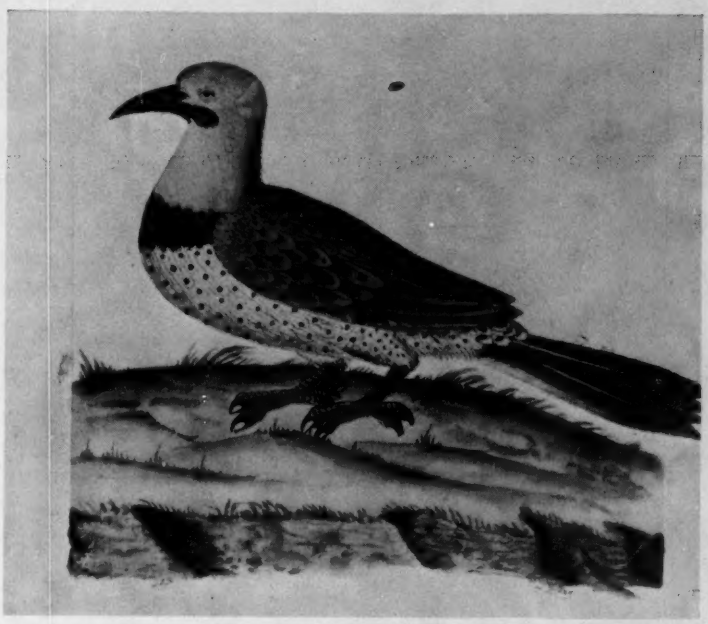
The first volume contains 130 water color drawings entitled, in the artist's own handwriting, "The pictures of sundry things collected and counterfeited according to the truth in the voyage made by Sir Walter Raleigh Knight for the discovery of La Virginia. In the 27th year of the most happy reigne of our Soveraigne lady Queene Elizabeth and in the year of or Lord God 1585."

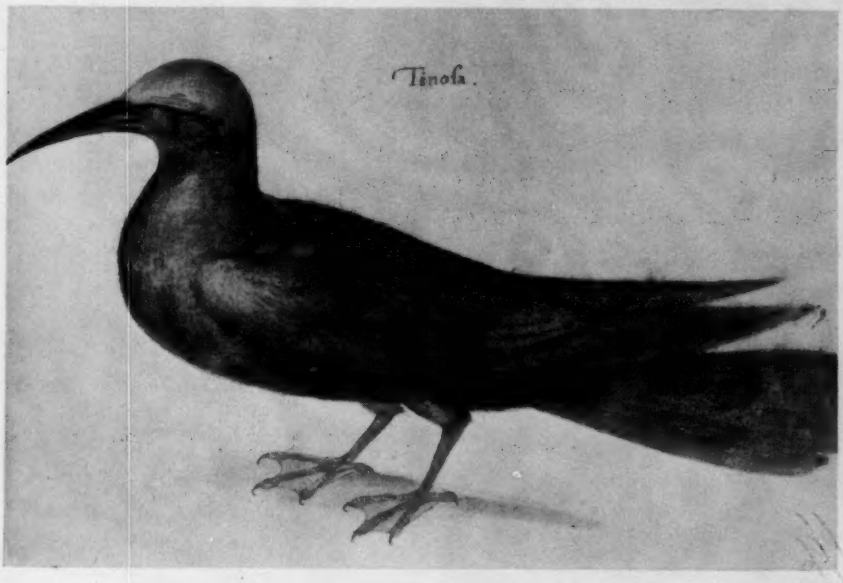
These drawings, however, are not all of American subjects. It is said

[1] In 1585 the name "Virginia" was used to designate, besides present Virginia, the territory southward to Florida.

[2] According to Justin Winsor, Narrative and Critical History of America, Vol. III, p. 123, these White water colors were sold to the British Museum for £210.

[3] Bibliotheca Historica, 1870.





PAINTINGS BY JOHN WHITE (ABOUT 1585).
EARLIEST PAINTINGS OF NORTH AMERICAN BIRDS.
UPPER: FLICKER (COLAPTES AURATUS).
LOWER: NODDY (ANOUS STOLIDUS).

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that White had done considerable other exploring, including travels on the continent of Europe, and also to Greenland. This explains the presence of Esquimos, ancient Britons, an oriental woman, and other figures among the drawings which are mostly American. The American material includes many very well executed drawings of Indians, and Indian customs and ceremonies, in addition to the paintings of natural history subjects.

The birds in this album of pictures are numbered as follows, the names in italics being those of White, the descriptive notes those of the writer:

58. *Alcatras*[1]—The head of a Brown Pelican.
59. *Timosa*—Noddy Tern.
60. *A Flaminico*—Flamingo.
61. Hoopoe—not American.
62. A large seabird with spread wings.
63. *Bobo*—Booby.
64. The Roller—not American.
65. Tropic Bird.

The present ranges of these American birds would seem to indicate that they were probably drawn en route somewhere in the West Indies rather than in the Roanoke colony.

Of special interest also to ornithologists is White's drawing of an Indian Flyer (No. 16), who, as a badge of his occupation, wears a bird adorning his head. This shows remarkable detail and delicacy of execution in the feathers. The same is true to a lesser extent of the Flamingo, No. 60 (Binyon catalogue, No. 62).

It is necessary to state that there is an apparent discrepancy between the numbers on the drawings and the numbers by which the drawings are designated in the descriptive catalogue.[2] For example, No. 60, according to the number on the drawing, is referred to as No. 62 in the catalogue, while the drawing bearing No. 58, is No. 60 in the catalogue. The drawing bearing No. 59 (the Noddy Tern, reproduced herewith Plate V, fig. 1), is No. 61 in the catalogue, and the drawing of the Hoopoe bearing No. 61, is No. 63 in the catalogue.

In addition to the birds in this album, there are drawings of other natural history subjects, such as insects, scorpions, turtles and lizards.

The second of the three volumes of John White Drawings bears the following identifying title and number: "John White's Drawings in Water Colours 1585. Offsets in 1865."

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[1] Alcatras. This drawing bears the descriptive remark: "This fowl is of the greatness of a swanne and of the same forme, saving the head which is in length 16 ynches." Below is the name Janboril, while the word Alcatras appears above in what is probably the artist's own hand. Alcatras was an Indian name and was widely adopted by travellers for the Pelican.

[2] Lawrence Binyon, Catalogue of Prints and Drawings in the British Museum.

On the inside surface of the binding we read: "Dept. of Prints and Drawings Books of Prints Case 199 No. A. 2."

These are evidently the offsets which Stevens describes in his 'Bibliotheca Historica,' pp. 225–226, as having resulted from a fire at Sothby's in London in June 1865. The originals remained in a saturated condition under great pressure for three weeks. In spite of this catastrophe, the drawings were unharmed, and during that time produced duplicates on the contiguous sheets of paper. Mr. Stevens salvaged the treasures and had the 'offtracts,' as he said, "carefully preserved, reversed in the binding, and sized at no little cost of time and money." These unique by-products of a disastrous fire are surprisingly exact copies of the originals but are somewhat fainter in color, and were sold to the British Museum for 25 guineas.[1]

The third and last volume of the John White Drawings bears the following identifying numbers: "Case 199, No. a. 3 Sloane 5270."

Unfortunately for our fragmentary knowledge of John White and his contribution to American ornithology, the authenticity of some of these water colors has been questioned, and, according to Dr. Lawrence Binyon, formerly Keeper of Prints and Drawings, and author of the Catalogue of Prints and Drawings in the British Museum, some of the drawings in this album may be copies of certain of John White's Originals that have not been found. These paintings are considerably brighter in coloring and show greater detail. No theory as to the identity of the artist who may have copied them is offered, but the assumption is that he was a contemporary, or near contemporary of White. No. 91 of this album, obviously a Flicker (*Colaptes auratus*) is reproduced herewith (Plate V, fig. 2). According to the 'Check-List of North American Birds,' the Flicker was described by Linnaeus based on *Picus major alis aureis* of Catesby. This drawing of the Flicker, therefore, indicates that the species was known and pictured nearly 150 years previous to Catesby's description of it.

It is very unfortunate that so little is known of Captain John White. From the researches of Stevens,[2] we know that he was a prominent man in London, the friend of Sir Walter Raleigh and Sir Richard Hakluyt, the latter of whom introduced him to Theodore De Bry, the famous engraver of Frankfort. De Bry was then contemplating the publication of his collection of 'Illustrated Voyages,' and twenty-three of White's drawings were used to illustrate Part I of these "Peregrinations." Through this association he was also a friend of Jaques Le Moyne,[3] some of whose engravings of

[1] According to Justin Winsor, Narrative and Critical History of America, Vol. III, p. 123, the offsets were sold to the British Museum for £60, 5s.

[2] Henry Stevens, Thomas Hariot and his Associates, London, Privately printed MDCCCC.

[3] To Le Moyne we are indebted for one of the earliest, if not the first engraving of the Wild Turkey of the South, published with his Brevis Narratorio. In the lower left hand corner one Turkey is figured with spread tail and drooping wattle. Voyages of De Bry, Part II, 1591.

Florida Indians, scenes, and natural history subjects were used in Part II of De Bry, published in 1591.

To both of these artists, White, who worked in America, though interruptedly, from 1585 to 1590, and to Le Moyne, who spent a year (1564–1565) with René Laudonnière in and around Fort Caroline, American naturalists might well give a modicum of their interest, in the hope that these very early observers of our birds, plants and animals may eventually become better known and more fully appreciated by the modern student.

Concerning John White, aside from his association with Raleigh, De Bry, Hariot, Hakluyt and Le Moyne in the cooperative enterprise of publishing De Bry's Voyages, almost nothing has been discovered. Although an artist known to the Queen, he does not appear in any dictionary of painters, and his name occupies but a few lines in the 'Dictionary of National Biography.'

From the writings of Hakluyt, however, we glean the fact that he made at least four voyages to America, and on the second one, which left England in April 1587, he went as Governor of Raleigh's "Second Colonie," consisting of one hundred fifty persons. Among this number were his daughter and her husband who were to become the parents of Virginia Dare, the first English child born in English North America. On arriving at Roanoke and finding conditions disappointing, however, many of the colonists were dissatisfied and persuaded their Governor to return to England. He, therefore, reluctantly returned home with some of the colonists, but left many behind, including his daughter and grandchild, planning to return to them with all possible haste. While he was at home, however, the fear of Spanish invasion gripped all England, and all suitable vessels were commandeered to the defense of the motherland. White, therefore, was unable to go to his countrymen in America until 1590, when a Fifth Expedition was fitted out to carry aid to the deserted colonists. Upon arrival, no trace of them could be found, but Captain White, in going over the ground, found some of his own chests, which had been buried, dug up and broken open, their contents of books, maps and drawings torn and stained with the rains and his armour rusted through.[1]

His subsequent career is entirely unknown, except that he retired to Raleigh's estates in Kylmore, Ireland, whence he penned a letter to his friend, Richard Hakluyt, dated the 4th of February, 1593. This is the last fragment of his biography, so far as we know, that has been preserved.

Laboratory of Ornithology,
Cornell University, Ithaca, N. Y.

It is likewise interesting to know that a collection of 59 beautiful paintings of plants and flowers by Le Moyne has recently been found. It is at present housed in Room 71 of the Victoria and Albert Museum, South Kensington, London. Diligent search failed to reveal any American birds in this collection.

[1] Stephen B. Weeks, The Lost Colony of Roanoke. American Historical Association, Papers 5, 1891, pp. 107–146.

AN ATTEMPT TO MEASURE STATISTICALLY THE DIFFERENCES BETWEEN EASTERN AND WESTERN SUBSPECIES OF THE SAME SPECIES.

GLADYS M. RELYEA.

THE amateur bird student whose observations have been confined to a relatively small area, finds himself continually amazed by the apparent likenesses yet important differences in closely related birds, when he first invades an entirely new region. Such was the writer's experience when, after a lifetime spent in the southern New England states, circumstances permitted an extended stay in northern California. So deep an impression did these similarities and dissimilarities make, that after consultation with an ornithologist and a statistician, the writer decided to attempt the statistical measurement of these deviations.

The first problem which arose was that of limiting the study to the most nearly related birds. It was decided to include only subspecies whose eastern and western representatives bred in as nearly comparable regions as possible, thus eliminating to some extent the environmental factor. Since most of the New England states are included in that area enclosed by 40° North Latitude and from 67°–80° West Longitude, an approximately equal area was found in the Western states above 40° North Latitude and from 115°–124° West Longitude. The western region includes northern California, much of Oregon and Washington, and parts of Idaho, Montana, and Utah. A map of the Life Zones in the United States, which may be found in the American Ornithologists' Union 'Check-List' for 1931, shows that these two regions are made up chiefly of the Canadian and Transition Zones. The final decision was that the study would include only those species which had subspecies in each of the two regions, the presence of such subspecies being based on the fact of their breeding, at least partly, in these areas, using the A. O. U. List of 1931 as authority, and limiting the species to the order Passeriformes.

The final list of subspecies to be used, twenty pairs, was as follows:

Eastern	*Western*
Empidonax trailli trailli	Empidonax trailli brewsteri
Corvus b. brachrhynchos	C. b. hesperis
Penthestes a. atricapillus	P. a. occidentalis
Sitta c. carolinensis	S. c. aculeata
Certhia familiaris americana	C. f. occidentalis
Troglodytes a. aedon	T. a. parkmani
Nannus h. hiemalis	N. h. pacificus
Telmatodytes p. palustris	T. p. paludicola
Turdus m. migratorius	T. m. propinquus
Hylocichla guttata faxoni	H. g. nanus

Eastern	*Western*
Hylocichla f. fuscescens	H. f. salicola
Vireo s. solitarius	V. s. cassini
Vireo g. gilvus	V. g. swainsoni
Vermivora r. ruficapilla	V. r. ridgwayi
Agelaius p. phoeniceus	A. p. caurinus
Carpodacus p. purpureus	C. p. californicus
Spinus t. tristis	S. t. salicamans
Passerculus sandwichensis savanna	P. s. bryanti
Pooecetes g. gramineus	P. g. affinis
Spizella p. passerina	S. p. arizonae

The second major problem to be solved was that of finding characteristics to be compared which were capable of being worked on statistically. The writer would have liked to make comparisons of such traits as color, song, nesting habits, eggs, etc., but soon found that the data available were very meager, especially for the western subspecies. Therefore, the study resolved itself into an intensive comparison of the sizes of the subspecies. Here Ridgway's 'Birds of North and Middle America,' Volumes I to IV, were of great value, since they contain measurements of skins collected for both eastern and western subspecies. The measurements available were these: length of the dried skin, wing length, tail length, length of the exposed culmen, depth of the bill at the base, length of tarsus, length of the middle toe.

As no listing of the actual measures of the individual birds was given, but only the maximum, minimum, and average measures of each characteristic, a modified method for deriving the critical ratio was resorted to. An example of the procedure follows, taking *Vireo solitarius solitarius* and *V. s. cassini* (female) and the characteristic, "length from tip of bill to tip of tail";

10 specimens of V. s. s. measured from 118 to 131 mm. with the average at 123.6 mm.

$$\sigma_{m_1} = \frac{R}{6\sqrt{n}} = \frac{131-118}{6\sqrt{10}} = .685$$

9 specimens of V. s. c. measured from 117 to 127 mm. with the average at 121.7 mm.

$$\sigma_{m_2} = \frac{R}{6\sqrt{n}} = \frac{127-117}{6\sqrt{9}} = 555.$$

$$\sigma D_{m_{12}} = \sqrt{\sigma_1^2 + \sigma_2^2} = .882$$

$$D_{m_1-m_2} = 123.6 - 121.7 = 1.9$$

$$\frac{D}{\sigma D_{12}} = \frac{1.9}{.882} = +2.15 \text{ (critical ratio)}$$

For purposes of this study, it was decided to put the minimum critical ratio which would be accepted as significant, at 3. This would raise to a

high degree the chances that future measurements of these twenty pairs of subspecies would give similar differences in the characteristics measured. Thus we see that the + 2.15 critical ratio for females of *Vireo solitarius solitarius* and *Vireo solitarius cassini* in the characteristic "length" cannot be considered here as statistically significant, since it does not meet the minimum critical ratio set up. The list which follows later presents the results of the application of this statistical procedure giving subspecies which possess a critical ratio from 3 to 10 as unstarred, and those with a ratio of ten and above, as starred. The list is divided as to sex and as to Eastern and Western subspeccies. In all cases, the Eastern subspecies is used as the standard, from which the Western, by being larger, gives the ratio a minus quality, and by being smaller, gives it a plus quality. Thus, if *Penthestes atricapillus atricapillus* is listed under the Eastern Male heading for Total Length, this placement is to be interpreted to mean that the specimens of male *Penthestes a. atricapillus* for which measurements are available have been found to show a distinct difference in this characteristic when compared statistically with the specimens of *Penthestes atricapillus occidentalis* for which measurements are available, a difference which is described by a critical ratio of from 3 to 10; in this particular case, of + 6.036.

This procedure was used for each of the characteristics for which measurements were available, treating male and female measurements separately, in each of the twenty pairs of subspecies. It is obvious that twenty pairs is not a large enough number from which to draw definite conclusions as to the probability of western subspecies in general being larger or smaller than eastern subspecies in general. Also, the statistical method used was not all one could wish, but notwithstanding these and other limitations of the study, the writer feels that certain interesting facts were brought out, and that this type of procedure has possibilities for future work in bird ecology.

The following table gives the subspecies showing the significant ratios (3 and above) for each characteristic measured, taking males and females separately: (* means ratios 10 or above)

MALE

Eastern	*Western*
Total Length	
*Hylocichla guttata faxoni	*Spizella passerina arizonae
Corvus b. brachyrhynchos	Troglodytes aedon parkmani
Penthestes a. atricapillus	Nannus hiemalis pacificus
Vireo s. solitarius	Turdus migratorius propinquus
Passerculus sandwichensis savanna	Vermivora ruficapilla ridgwayi
Pooecetes g. gramineus	Agelaius phoeniceus caurinus
Wing Length	
*Penthestes a. atricapillus	Troglodytes a. parkmani
*Hylocichla g. faxoni	Turdus m. propinquus
*Carpodacus p. purpureus	Spizella p. arizonae

MALE—*Continued*

Eastern	*Western*
Wing Length	
Corvus b. brachynchos	
Sitta c. carolinensis	
Certhia familiaris americana	
Hylocichla f. fuscescens	
Vireo s. solitarius	
Vireo g. gilvus	
Spinus t. tristis	
Passerculus s. savanna	
Pooecetes g. gramineus	
Tail Length	
*Spinus t. tristis	Troglodytes a. parkmani
*Penthestes a. atricapillus	Turdus m. propinquus
Corvus b. brachyrhynchos	Vermivora r. ridgwayi
Hylocichla g. faxoni	Carpodacus purpureus californicus
Vireo g. gilvus	Spizella p. arizonae
Pooecetes g. gramineus	
Exp. Culmen	
*Hylocichla g. faxoni	Empidonax trailli brewsteri
*Vireo g. gilvus	Penthestes a. occidentalis
Telmatodytes p. palustris	Certhia f. occidentalis
Pooecetes g. gramineus	Vireo s. cassini
	Agelaius p. caurinus
	Passerculus s. bryanti
	Spizella p. arizonae
Tarsus Length	
*Corvus b. brachyrhynchos	Penthestes a. occidentalis
*Hylocichla g. faxoni	Turdus m. propinquus
Sitta c. carolinensis	Vireo s. cassini
Troglodytes a. aedon	Vermivora r. ridgwayi
Nannus h. hiemalis	Carpodacus p. cassini
Telmatodytes p. palustris	Spizella p. arizonae
Hylocichla g. faxoni	
Vireo g. gilvus	
Passerculus s. savanna	
Pooecetes g. gramineus	
Agelaius p. phoeniceus	
Middle Toe Length	
*Sitta c. carolinensis	Certhia f. occidentalis
Corvus b. brachyrhynchos	Spizella p. arizonae
Hylocichla g. faxoni	
Vireo g. gilvus	
Pooecetes g. gramineus	
Depth of Bill at Nostrils	
*Corvus b. brachyrhynchos	
*Vireo g. gilvus	
Depth of Bill at Base	
*Agelaius p. phoeniceus	
*Pooecetes g. gramineus	
Carpodacus p. purpureus	

FEMALE

Eastern	*Western*
Total Length	
*Hylocichla g. faxoni	*Telmatodytes palustris paludicola
Corvus b. brachyrhynchos	Turdus m. propinquus
Vireo g. gilvus	Sitta c. aculeata
Passerculus s. savanna	Nannus h. pacificus
Pooecetes g. gramineus	Agelaius p. caurinus
	Spizella p. arizonae
Wing Length	
*Penthestes a atricapillus	Turdus m. propinquus
*Hylocichla g. faxoni	Hylocichla fuscescens salicola
Corvus b. brachyrhynchos	Agelaius p. caurinus
Certhia f. americana	Spizella p. arizonae
Vireo s. solitarius	
Vireo g. gilvus	
Vermivora r. ruficapilla	
Carpodacus p. purpureus	
Pooecetes g. gramineus	
Tail Length	
*Penthestes a. atricapillus	Troglodytes a. parkmani
Corvus b. brachyrhynchos	Nannus h. pacificus
Sitta c. carolinensis	Telmatodytes p. paludicola
Certhia f. americana	Turdus m. propinquus
Hylocichla g. faxoni	Hylocichla f. salicola
Vireo g. gilvus	Agelaius p. caurinus
Vermivora r. ruficapilla	Spizella p. arizonae
Exp. Culmen	
*Telmatodytes p. palustris	*Sitta c. aculeata
Corvus b. brachyrhynchos	Penthestes a. occidentalis
Hylocichla g. faxoni	Troglodytes a. parkmani
Vireo g. gilvus	Nannus h. pacificus
Vireo s. solitarius	Agelaius p. caurinus
	Passerculus s. bryanti
	Spizella p. arizonae
	Carpodacus p. californicus
Tarsus Length	
Corvus b. brachyrhynchos	Vireo s. cassini
Penthestes a atricapillus	Agelaius p. caurinus
Telmatodytes p. palustris	Pooecetes g. affinis
Hylocichla g. faxoni	Spizella p. arizonae
Vireo g. gilvus	
Passerculus s. savanna	
Spinus t. tristis	
Middle Toe Length	
Sitta c. carolinensis	Penthestes a. occidentalis
Troglodytes a. aedon	Nannus hiemalis pacificus
Hylocichla g. faxoni	Telmatodytes p. paludicola
	Hylocichla f. salicola
	Agelaius p. caurinus

FEMALE—*Continued*

Eastern	*Western*
Depth of Bill at Nostrils	
*Vireo g. gilvus	
*Corvus b. brachyrhynchos	
Depth of Bill at Base	
Pooecetes g. gramineus	

From the data contained in these tables, it seems safe to draw the following conclusions:

1. The outstanding male birds, judged by the size of the critical ratios and the number of characteristics superior in, are: the Eastern Warbling Vireo (*Vireo gilvus gilvus*), the Eastern Hermit Thrush (*Hylocichla guttata faxoni*), the Eastern Vesper Sparrow (*Pooecetes gramineus gramineus*), the Eastern Crow (*Corvus brachyrhynchos brachyrhynchos*), and the Western Chipping Sparrow (*Spizella passerina arizonae*).

2. The outstanding female birds, judged on the above standard, are: the Eastern Crow, Eastern Hermit Thrush, Eastern Warbling Vireo, Northwestern Red-wing (*Agelaius phoeniceus caurinus*), and the Western Chipping Sparrow.

3. If we were to select the birds most apt to show the same superiority in the majority of its characteristics measured, both male and female, we would choose the Eastern Warbling Vireo, Eastern Hermit Thrush, Eastern Crow, and the Western Chipping Sparrow.

4. The general superiority in measurements of all characteristics seems to go to the Eastern subspecies, in about the ratio of ten to four.

5. It seems likely that should measurements be made of additional birds of the subspecies starred to show critical ratios of ten or more, the same superiority would be found over its eastern or western mate, as the case might be.

As has been suggested previously, it would be of value if some method of comparing and contrasting color variations, songs, nesting habits, egg color and number, etc., of subspecies could be devised. Perhaps a color card with a numerical value for each shade could be used for feathers and eggs, and the number of eggs could be used in the same manner as the measurements of body, wing, tarsus, etc. In any case, there exists a distressing lack of data on these and other characteristics of subspecies, particularly the western ones. It is the writer's hope that this article may point out the lack of information, and that competent ornithologists will seek to remedy it.

147 Midland St., Bridgeport, Conn.

*Should any reader wish further details on the statistical procedure used or the means of arriving at the results, the writer will be glad to furnish them.

OBSERVATIONS ON THE AMETHYST SUNBIRD, *CHALCOMITRA AMETHYSTINA AMETHYSTINA* (SHAW).

BY RAYMOND B. COWLES.

The following observations were recorded in the Umzubi Valley, Natal, South Africa where this species is known by the Zulus as *i' nCwincwi elimnyama.*

This is probably the most common Sunbird in the thorn-bush association and is found frequenting the open glades and edges of the bush. It is not ordinarily found in the bush itself, but seems to prefer open territory rather than the dense cover.

While feeding on their favorite source of nectar, the blossoms of the umSinsi (*Erythrina caffra*) the male is at times very conspicuous and makes a splendid contrast, jet black against scarlet blossoms, but at times they appear to vanish mysteriously and yet with careful searching will be revealed not far from the spot where they had been perched a minute before. A possible explanation of this variation in visibility may lie in the bird's proximity to shadows of the blossom clusters or of the larger branches. Certainly, when looking upwards against the dazzling sky of winter, shadows under the blossoms and lower surfaces of the branches appear to be black. It would be interesting to make observations on the visibility of the species as seen from above with the source of illumination behind one.

A note made while observing these birds in an uHluzi tree in full bloom (a tree which bears its blossoms in the shade close to the trunk and which therefore presents a different illumination and environment) indicates that while in the uHluzi tree the dull colored females were inconspicuous but the jet black males were very conspicuous contrasting wonderfully with the red blossoms.

The following observations of courtship and nest building may be of value. The nest described in the following paragraphs, was located within six feet of a window near a table at which about seven hours per day were spent skinning specimens and writing.

An amethyst Sunbird was observed going through courtship antics in June, four months before the nesting took place, for nesting does not take place until September. Apparently the antics are a carry-over and become play. The male was hopping about on a branch near a female, drooping first one wing then the other then both wings at once. As each wing was lowered, it was fluttered and displayed. The female, in the meantime, appeared interested and at one stage was seen to hang head downward, in a stiff and rigid posture, without any perceptible movement. The same courtship antics may be observed during the breeding season.

Early in September a pair of Amethyst Sunbirds were seen behaving as though they were hunting for nesting materials and a large wad of cotton wool was hung on an iron rod depending from the (stoep) porch roof. By September 7 the cotton had been carefully plastered over with lichens, and on the evening of the same day, after a day of work, a doorway was beginning to show with a visor coming into evidence. Aside from this doorway there was no other sign as to which was back or front of the nest, the rest of the mass was simply a wad of cotton-wool just as it had been when first placed in position except that the surface had been covered as previously mentioned.

The bird commenced work at approximately 10:00 a. m. and left work at approximately 3:00 p. m. These hours were regularly observed during most of the nest building activities.

On September 15 the male appeared for the first time since the selection of the nesting site. (During the selection he had been exceedingly attentive and solicitous although most of the attention was directed toward his mate rather than toward work.) For an hour or so the male made sporadic attempts to interest his mate, and then having made no headway he appeared to give up and did not return again until twelve days later. The female was hard at work, still making over the doorway. Fourteen visits were made in the course of an hour although twelve of them were made during one twenty-five minute period.

On September 16 some progress had been made and the back and body of the nest were being fashioned. The bird would alight on the floor of the entrance and from that position tuck in and pull out parts of the nest in the process of mending and shaping, and from time to time she entered the nest in order to wriggle around and around as though testing for size, at the same time she stretched the nest here and there to make a good fit. At one time after some particularly vigorous efforts she sat still for a moment, head out, and snuggled down as though making still another test.

The doorway faced away from the light and toward the walls of the house. It would be interesting to note the relative position of other nest openings of this species in relation to light and shelter. So far as an observer can tell, the nest could have been placed facing in any other direction with equally satisfactory results.

By September 19 the nest was fairly well along in construction and the porch or visor seemed at last finished and satisfactory and the lining of the nest was begun.

From the above date until September 27 only a few visits were paid to the nest but on this date both birds made a visit and while the female entered and crouched in the nest the male clung to the entrance, billing the female affectionately. On this visit the female brought some downy substance for

lining the nest but the activities seemed perfunctory or merely a continuance of habit. (A nest watched the previous year showed that the same thing happened, i. e., after completion of the nest the birds left for two or three days scarcely coming near the spot, and then returned, being much more shy following the rest period.)

The occurrence of the rest period and subsequent shyness fits into the general pattern of bird behavior in nesting, bold when incubation is progressing, shy during hatching, bold when all the young are hatched and growing, shyness when young have reached independence.

On September 28 a few visits were made, each time carrying down for lining purposes although the nest was already thick and warm. The next day, September 29, the first egg was laid and that night the female slept in the nest for the second time. At about 8:00 a. m. a second egg was laid.

The female remained in the nest most of the time during the day and always at night until October 3, invariably with the bill resting on the rim of the porch and projecting just beyond the outermost margin of the visor. On the night of the third, she did not sleep in the nest, and was absent all day on the fourth, and most of the day on the fifth. On that day she arrived at 3:30 p. m., remaining until 5:30 p. m. and left again not to return.

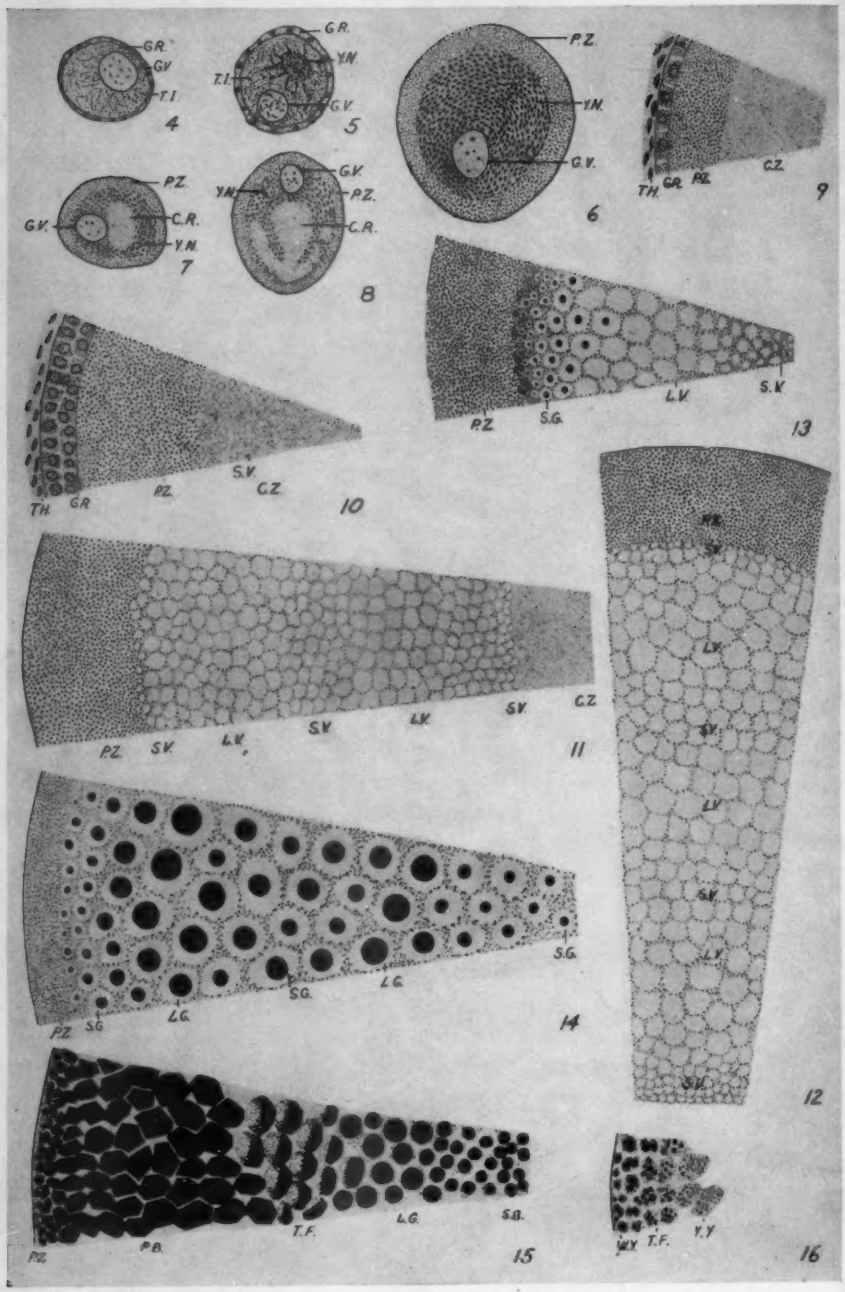
The nest had been carefully protected from handling or close approach and care had been taken not to disturb the birds, but for several days before deserting she had been unsettled and nervous.

The following account by an untrained observer (Mr. F. B. Cowles) was at first considered by the writer to be a misinterpretation of an interesting feeding habit but since his experience with the cotton ball he is less doubtful although he still wishes to see the performance with his own eyes, or see a report from a trained observer. The report is as follows:

"In certain tall mimosa trees which grow rather commonly throughout this section . . . a certain spider builds a large globular 'nest.' This is attached to the end of a long slender branch. At a period when the spiderlings are about the size of the head of a pin, the male Sunbird attacks and kills what is apparently the parent spider (?) and makes an opening in the side of the nest. This opening is about an inch in diameter. During the attack and opening of the nest only the male bird was seen, later the female appeared and for three weeks or so the pair were constantly in the vicinity, the male most frequently."

These observations led the observer to believe that the birds had taken the spider's nest and converted it to their own use. During part of this time the nest was swarming with young spiderlings "and the Sunbirds were seen feeding on them and entering the nest. The nest was allowed to remain unmolested and the eggs were never seen."

University of California at Los Angeles.



OVARIAN FOLLICULES IN THE STARLING.
STURNUS VULGARIS.

NORMAL PROGRESSIVE CHANGES IN THE OVARY OF THE STARLING (STURNUS VULGARIS) FROM DECEMBER TO APRIL[1].

THOMAS HUME BISSONNETTE AND ALPHONSE JOHN ZUJKO.

Plates VI–VII.

INTRODUCTION.

THE normal progressive part of the seasonal sexual cycle of the male Starling was described and discussed in relation to environmental factors by Bissonnette and Chapnick (1930); the regressive part of the cycle by Bissonnette (1930b); and modifications of the cycles in males by experimental manipulation of the seasonal light cycle to which the birds are exposed in a series of papers from this laboratory (Bissonnette, 1930a, c, 1931a, b, 1932a, b, d, e, f, 1933a, b; Bissonnette and Wadlund, 1931, 1932, 1933).

On the female side no such study appears to have been made. So this study of the normal progressive part of the seasonal cycle of the ovary with respect to (1) Changes in size of ovarian follicles, (2) Rate of growth of the largest follicle in each ovary, and (3) Yolk formation, was undertaken, to provide a necessary standard for comparison in future studies of the changes in ovaries induced by artificial modification of light cycles. These light manipulations have already been found to modify and even reverse the normal cycles of the testes in males of this species.

(1) Follicle size changes.

Like the testes, ovaries increase in size slowly through February and March, and rapidly in April. Earlier workers have expressed the sizes of ovarian follicles in terms of their diameters. With small follicles, this is not difficult because the usual techniques do not cause distortion by shrinkage, and diameters are easily measured by taking diameters at right angles from camera lucida outlines of the circular or oval outlines of the largest section of any given follicle. With large ripening follicles, however, the usual techniques cause shrinkage and collapse of the follicles, which give sections of irregular outlines when cut. In such cases the usual methods of measuring diameters become unreliable. A new method has been devised to determine the diameters of the larger follicles and, from them, their size, for correlation with intra-follicular changes.

Measurements of the 14 largest follicles in each ovary have served for the most part in this study. But in some cases smaller ones were also measured.

[1] Aided by grants from the Committee for Research in Problems of Sex, National Research Council, 1932–4, administered by T. H. Bissonnette.

In the December ovary the 14 largest follicles are almost uniform in size. In February and March some of them increase in size, but at different rates, so that uniformity of size is lost and differences in size become more pronounced. From late March till April 20, these size differences in the 14 largest follicles increase rapidly as described by many earlier investigators for other animals.

(2) Growth Rate of Largest Follicles.

Riddle (1911) found that, in the Pigeon, 5–8 days before ovulation, when ova are at a diameter of about 6 mm., growth rate rises to about 8–20 times that formerly prevailing. Our measurements on starling material show that the average rate of growth of the largest follicle of each ovary is slow during December, January, and February; increases moderately through March; and becomes very rapid in April. During this April period, the rate of growth of several of the largest follicles increases appreciably from day to day.

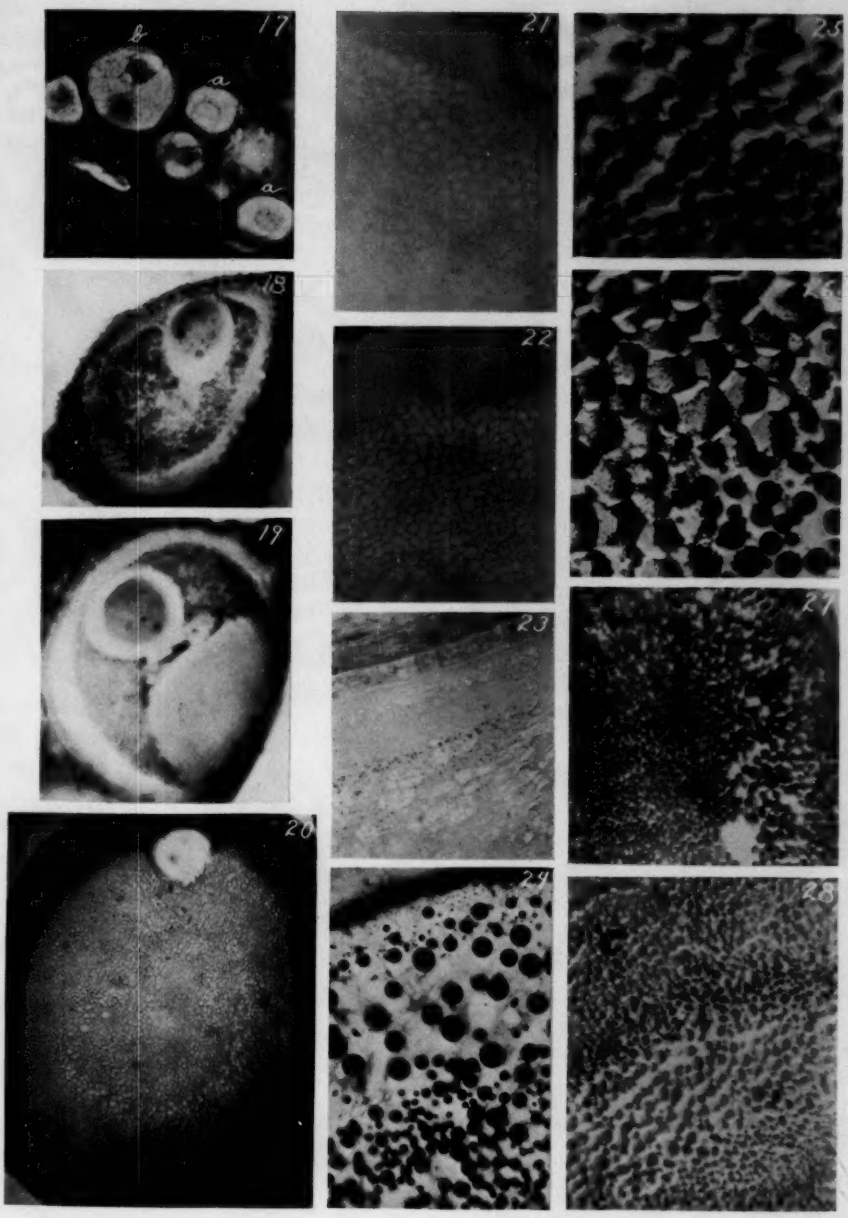
(3) Yolk formation.

The origin of yolk has been long discussed, but without general agreement. It is generally agreed, however, that yolk formation involves the transport of fat from the blood stream through the follicle wall, and its deposition in the maturing oöcyte or ovum, within the follicle. This study attempted to follow the intrafollicular changes from primordial to ripe follicles, covering modes of formation of vacuoles, of white and yellow yolk materials, thickness of peripheral zones of follicles, diameters of white yolk granules and of yellow yolk bodies, as deposited, in relation to follicle size.

MATERIAL AND METHODS.

The procedure followed in securing and killing birds was that used by Bissonnette (1930b) and Bissonnette and Chapnick (1930). At killing, oviducts were removed and fixed in extended condition to prevent curling and facilitate measurement. The left ovaries, syringes, and thyroid glands were fixed in the same reagent, Bouin's fluid. Pituitaries were fixed in Zenker's fluid with formic acid replacing acetic. Dehydration and paraffin infiltration were carried out by our own modification of a butyl alcohol technique suggested by Dr. Conway Zirkle, as follows:—

A stock mixture was prepared consisting of 50 units of 95% ethyl alcohol + 50 units of absolute butyl alcohol. From this, the following series of solutions was prepared. (1) 50 units of stock + 45 units water = 50% solution. (2) 70 units stock + 25 units water = 70% soln. (3) 80 units stock + 15 units water = 80% soln. (4) Stock alone = 95% soln. (5) Absolute butyl alcohol.



OVARIAN FOLLICULES IN THE STARLING.
STURNUS VULGARIS.

UNIV. OF MICH.

Tissues for study were carried through these solutions in order, remaining about 2 hours in each, to a cold mixture of paraffin and butyl alcohol, left over night, transferred to warm paraffin in the bath, and embedded in the usual way, after 3 changes of paraffin at ½ hour intervals. All but the ovaries were filed away in paraffin blocks for future study.

Ovaries were sectioned serially at 10–12.5 μ and mounted as usual. Stains used were Heidenhain's iron-hematoxylin with or without eosin, Mallory's triple connective tissue stain, and a combination of the two methods using hematoxylin first. All were cleared in Xylol and mounted in balsam.

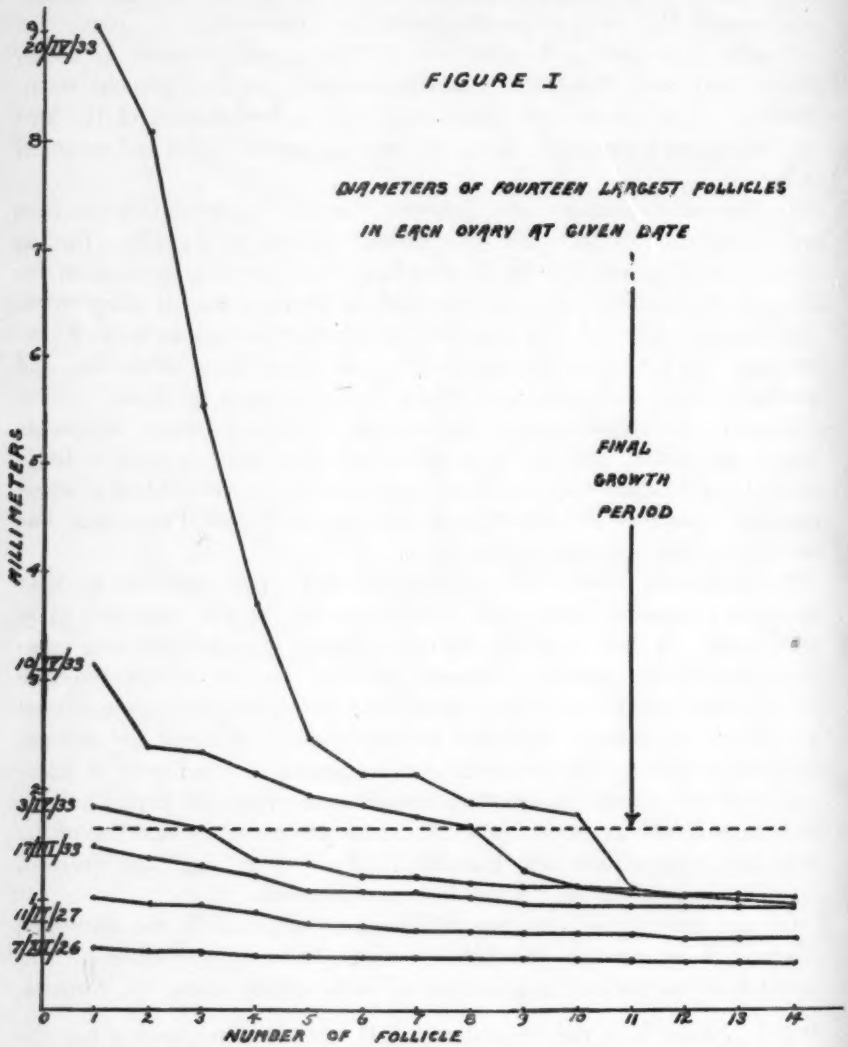
In December, January, and February, the ovaries are rather compact organs and the follicles retain their circular outlines on the slide. But, as the season progresses, follicles become larger and give oval sections on the slide, though macroscopic observation of the freshly removed ovary shows that they are spherical. In large follicles shrinkage occurs during technical procedure, as a result of the dissolving out of certain lipoid substances, and sections of the follicles become irregular in outline upon the slide. Macroscopically, the irregularities of the surfaces of follicles become noticeable during infiltration with warm paraffin, indicating that removal of butyl alcohol and its dissolved substances is more rapid than penetration of warm paraffin. However, this is not peculiar to the butyl alcohol technique, but occurs also with ethyl alcohol and xylol.

Camera lucida drawings of all follicles above a certain size were made at about 34.4 diameters from about every 6th or 8th section, depending upon follicle size. In these drawings, the larger follicles of each ovary were numbered and followed through succeeding sections. As new follicles above the certain size appeared in the series of sections, they were given new numbers, and when the already numbered follicles disappeared from the sections their numbers were discontinued and not repeated. From the set of drawings covering an entire series of sections from an ovary, the largest follicles were again drawn at 140 diameters and measured along the base line of the granulosa layer so that both granulosa and oöcyte or "egg" are included. A map measurer was used in this last measurement.

On the assumption that the follicles were spherical in the untreated ovary, the diameters of the follicles were calculated from these circumferences of the largest cross-section of each follicle, using the formula, $D = \frac{C}{\pi}$; where C is the circumference, D, the diameter, and π has the value 3.1416.

The relative magnitudes of the calculated diameters are shown graphically (fig. I) for the 14 largest follicles in each of a number of typical ovaries at given dates. In the figure, the largest follicle is designated no. 1; the

next in order of size, no. 2; and so on down to the 14th follicle in point of size. On the abscissa follicles are designated by number and the diameters of the follicles in millimeters on the ordinate axis. The curve, so formed,

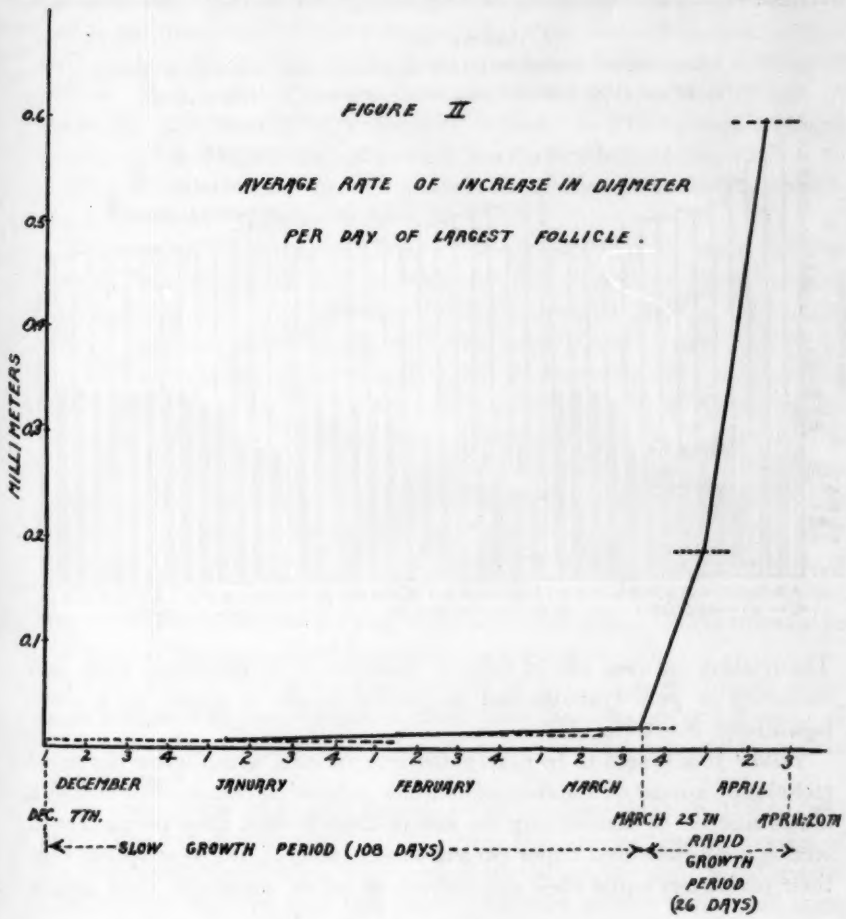


shows the relative diameters of the maturing follicles at the dates given at the left of each curve.

It must be assumed that the largest follicle in the ovary on a given date must have grown fastest or started earliest or both. The average rate of

growth of the largest follicles in each ovary was calculated and appears in Table I.

The time between December 7 and April 20, covered by this study, was divided for comparison into 5 unequal periods, based upon representative ovaries taken on the dates shown in Table II, which shows the number of



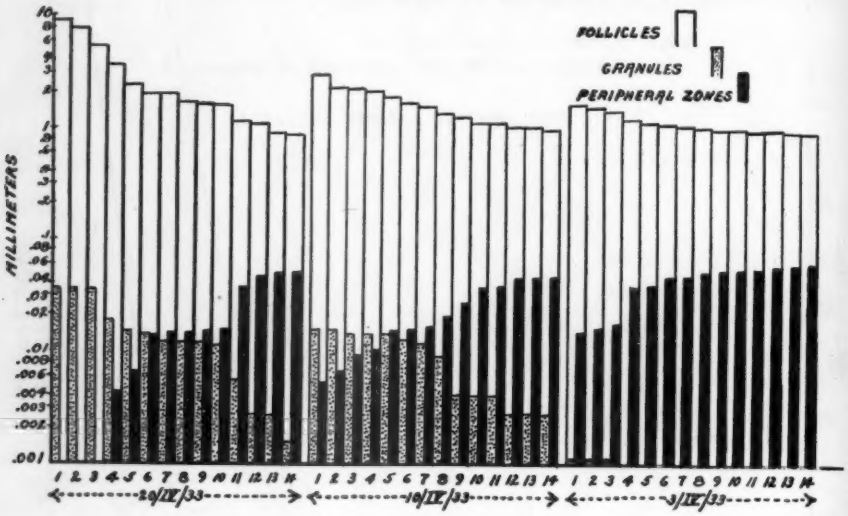
days in each period and the increase in diameter for the period, as calculated.

During the measurement and study of the follicles, it became evident that the arrangement of the protoplasm of the oöcyte changed with enlargement of the follicle. So a thorough study of the protoplasm in each follicle measured was made. Sections of all follicles previously drawn at 34.4 and

140 diameters were studied again under a magnification of about 700 diameters and the diameters of white yolk granules and of yellow yolk bodies in them, and the thicknesses of their peripheral zones, were measured and calculated, except the peripheral zones of very early stages. The exceptions were made because the line of demarkation between peripheral zone and central region was not sharp or clear enough for accurate measurements.

FIGURE III

RELATION OF SIZE OF FOLLICLES, GRANULES AND PERIPHERAL ZONES IN FOURTEEN LARGEST FOLLICLES IN OVARY OF GIVEN DATE.



The relation between size of follicle, thickness of its peripheral zone, and diameters of yolk granules and polyhedral bodies is shown by a semi-logarithmic chart (fig. III).

Yellow yolk is said to be aggregated into spheres, which, after the usual techniques, appear on the slide as irregular polyhedral bodies. For lack of a better method of determining the size of these bodies, their perimeters in section were measured under camera lucida, and, on the assumption that their perimeters equal their circumferences before shrinkage, their proper diameters were calculated from the formula $D = \frac{C}{\pi}$, as was done for follicle diameters.

SIZE OF FOLLICLES.

Most observers have pointed out that one or more sets of follicles undergo a more rapid rate of growth than the others; but none has attempted to classify these sets of follicles as they occur in monoestrous or dioestrous

birds; i. e. those with but one or two complete sexual cycles per year and a long period of anoestrum, or sexual quiescence, during autumn and winter.

By their macroscopic appearance, His (1868) distinguished four classes of follicles in the hen's ovary. In three ovaries, studied intensely, he found 5, 3, and 5 eggs, respectively, which were more than 9.0 mm. in diameter. Sonnenbrodt (1908) described the appearance of the ovarian egg of the hen and found that small follicles were grayish; larger ones, up to about 5 mm. in diameter, were whitish; while those over 5 mm. in diameter were quite yellow. He found that usually there were 3 or 4 follicles over 10 mm. in diameter. Patterson (1910) noted that, in hens, the follicles were arranged in sets, and that eggs were laid more or less rhythmically (Lillie, 1919).

We have classified the sets of follicles in the ovaries of the starling according to size from December to April 20.

The starling's ovary on December 7 is a small compact organ with its grayish follicles closely knit together by the connective tissue stroma. Three classes may be distinguished;—(1) primordial follicles, up to 0.04 mm. in diameter; (2) intermediate follicles, from 0.04 to 0.4 mm.; and (3) 14 large follicles ranging from 0.4 to 0.54 mm. in diameter, with an average of 0.463 mm. These 14 follicles are nearly uniform in size as shown by the small value (0.037 mm.) of the mean deviation about the mean diameter.

On February 11, the ovary is slightly larger, with a more or less uniform increase in the diameters of the 14 largest follicles over those of the December ovary. In each of the February ovaries, there are 4 classes of follicles in different stages of development. The diameters of the 14 largest range from 0.62 to 0.99 mm. Variations in size have become greater than those among the 14 largest follicles of the December ovary, as shown by the increase in the value of the mean deviation about the mean diameter.

In the March 17 ovaries, the diameter of the 14 largest follicles range from 0.90 to 1.48 mm. Eight of them have diameters over 1.0 mm. If these 8 are placed in a separate class, the ovary of this date will be said to have 5 classes of follicles.

On April 3, the 14 largest follicles range in diameter from 0.99 to 1.83 mm. The variation in size among them is still greater than in ovaries of the above mentioned dates. Mean deviation about the mean is 0.224 mm. The 3 largest follicles have just entered the final growth period and there are 5 distinct sets of follicles (fig. 1). Because the follicles in the final growth period vary so much in size, no definite classification as to size for the period was possible.

In addition to the above mentioned 5 sets of follicles, the ovary of April 10 has one follicle approaching the later stages of the final growth period, and 7 which have entered the final growth period.

The April 20 ovary contains the previously mentioned 5 sets of follicles,

6 follicles in the early stages, and 4 in the late stages of the final growth period.

The above classification is based upon the measurements of follicles as shown in Table I and Figure 1. Observations indicate that the number of small sized follicles in the early sets is great. In sets of larger follicles, the number in a set is smaller. In the final growth period, the variation in diameter among follicles in the late stages is greater than among those in the early stages, In other words, the number of follicles falling in a set decreases as the size of follicle increases. The follicles in ovaries of April 28 are smaller than those of April 20, indicating that the climax of activity is past and that ovulation of the largest, most advanced, follicles has occurred. So the study of these ovaries is not included here.

RATE OF GROWTH OF THE LARGEST FOLLICLE.

That the rate of growth of follicles in the ovaries of various animals is not uniform has been shown by Riddle (1911, 1916), Bartelmez (1912), D'Hollander (1904), Sonnenbrodt (1908), Hoffman (1892), Agassiz and Clark (1857) and others cited by them. Agassiz and Clark (1857) state that, in 7-year old turtles, there begins in the eggs a final rapid-growth period lasting for 4 years, in each successive set of eggs. Hoffman (1892) showed that, in Lacerta, an increased rate of growth of certain groups of ovarian follicles occurs in spring only. In pigeons, Bartelmez (1912) found a slow growth of the oöcyte to about 0.09 mm. in diameter. The smallest follicles then stop growth, and the others, increase to a diameter of 0.4 mm., apparently at the same rate of growth, and later, to 5.0 mm. From 5.0 mm. to ovulation size, growth is very rapid. Riddle (1911) found that 5–8 days before ovulation, when ova have reached a diameter of about 6 mm., the rate of growth suddenly increases about 8–20 times and Bartelmez agrees.

We have tried to determine the average rate of follicular growth for the various periods in the starling and the point at which this accelerated growth, characteristic of the final growth period, begins.

The diameter of the largest follicle in each of the representative ovaries is included in Table I, as stated. The number of days in each of the 5 periods between December 7 and April 20 and the increase in diameter of the tubules in the period are shown in Table II. The first 66 days from December 7 to February 11 constitute the first period, during which the diameter of the largest follicle increased from 0.54 to 0.99 mm. So the average rate of increase in diameter per day is 0.007 mm.

During the second period (Febr. 11–March 17), the average rate of increase in diameter rises to 0.014 mm. per day, double that of the first period (Table II).

In the third period (March 17–April 3) the average rate of increase in

diameter advances to 0.02 mm. per day, about 3 times that in the first period.

With the fourth period (April 3–10), this average rate is 0.187 mm. per day, about 27 times that in the first period and 9 times that in the immediately preceding period.

In the fifth period (April 10–20), that preceding ovulation, this rate is 0.594 mm. per day, about 85 times that of the first, and 3 times that of the preceding period.

As may be seen from Figure II, growth of follicle falls into two divisions; one of slow growth at about 0.009 mm. per day on the average, for 108 days to March 25; and a period of 26 days to April 20, just before ovulation, with average growth rate for largest follicle of about 0.285 mm. per day; about 31.6 times that in the first division. This short period of rapid growth is called the "final growth" period and corresponds roughly with the one called by that name in the literature. In the pigeon, according to Riddle (1911), this "final growth" period (with growth rate 8–20 times that preceding it) begins 5–8 days before ovulation, when the ovum is 6 mm. in diameter. In the starling with its smaller egg, this period begins on or about March 25, when the ovum is about 1.65 mm. in diameter, and the average rate of growth is about 31.6 times that in the long period of slow growth preceding it.

TABLE I.

DIAMETERS IN MILLIMETERS OF 14 LARGEST FOLLICLES IN OVARIES AT GIVEN DATES.

7/XII/26; 11/II/27; 17/III/33; 3/IV/33; 10/IV/33; 20/IV/33.

1.	0.54	0.99	1.48	1.83	3.14	9.08	Diameter of the largest follicle
2.	0.52	0.94	1.39	1.76	2.40	8.06	
3.	0.52	0.93	1.29	1.66	2.32	5.55	
4.	0.49	0.89	1.22	1.32	2.11	3.71	
5.	0.48	0.77	1.08	1.31	1.94	2.42	
6.	0.48	0.77	1.07	1.20	1.85	2.14	
7.	0.47	0.70	1.04	1.19	1.79	2.13	
8.	0.46	0.70	1.00	1.15	1.65	1.85	
9.	0.45	0.68	0.93	1.10	1.21	1.83	
10.	0.44	0.68	0.92	1.10	1.11	1.75	
11.	0.42	0.67	0.91	1.05	1.11	1.07	
12.	0.41	0.62	0.91	1.01	1.05	1.03	
13.	0.40	0.62	0.90	1.00	1.05	0.97	
14.	0.40	0.62	0.90	0.99	1.01	0.94	
	0.463	0.756	1.074	1.262	1.695	3.038	Average diameter
	0.037	0.108	0.155	0.224	0.526	2.035	Mean deviation about the mean

TABLE II.

RATE OF GROWTH OF LARGEST FOLLICLE.

Period	*Increase in diameter*	*Average rate of increase in diameter per day*	*Approximate relative rates*
7/XII–11/II.....	0.45 mm.	0.007 mm.	1.
66 days			
11/II–17/III.....	0.49	0.014	2.
34 days			
17/III–3/IV.....	0.35	0.02	3.
17 days			
3/IV–10/IV.....	1.31	0.187	27.
7 days			
10/IV–20/IV.....	5.94	0.594	85.

YOLK FORMATION.

Most of those who have studied ovarian development divide it into more or less clearly defined periods. On the basis of nuclear phenomena, the analyses of D'Hollander (1904) for the embryonic stages, and Sonnenbrodt (1908) for the subsequent growth periods, are among the best. Bartelmez (1912) has given one of the best treatments of the subject so far as the pigeon is concerned. He describes four periods in development of the ovarian egg on the basis of changes within the follicles, as follows:—

1st; (Oöcytes up to 0.09 mm.). The cytoplasm in the follicles contains 3 kinds of granules suspended in a homogeneous ground substance; (1) large deutoplasmic spherules, absent in the peripheral zone, but present in the central zone of the oöcyte; (2) the yolk nucelus, a granular region, at the center of the spherule cap, close to the germinal vesicle; and (3) mitochondria, which alone stain with Janus green.

2d; (Oöcytes 0.09 to 0.4 mm.). More spherules are laid down outside those already present, so that the peripheral zone becomes narrower. Spherules are present throughout the oöplasm, except in the peripheral zone and in the region of the yolk nucleus, which has increased in size and begun to spread in irregular blocks and bands. The basophile granules of the yolk nucleus eventually become distributed throughout the oöplasm, except in the peripheral zone, on the inner side of which, spherules are still being formed. From studies of freehand sections of follicles in this period, stained with Sudan III, he concludes that spherules are confined for the most part to a zone just inside the peripheral zone, leaving a clearing in the central region of the oöcyte.

3d; (Oöcytes 0.4–5.0 mm.). For a short time at the beginning of this period, no deposition of yolk spherules occurs, and the peripheral zone becomes thicker. Then another zone of spherules is laid down. This is the

first evidence of the periodicity in yolk formation which characterizes the final growth period (Riddle, 1911). While the germinal vesicle is still near the center of the oöcyte, the first definitive yolk granules (white yolk) appear in it. The germinal vesicle then migrates along the polar axis to the periphery at the animal pole. Shortly after the beginning of this migration, very fine yolk spherules appear in the central protoplasm, but not in the peripheral region. In oöcytes of 2–5.5 mm. diameter, growth is due chiefly to an increase in their fluid content, and a periodic deposition of yolk granules in the central protoplasm, while the peripheral protoplasmic zone becomes thinner. The path of the germinal vesicle to the periphery is marked by a trail of fine reticulum and the region that surrounded the germinal vesicle, during its stay near the center of the oöcyte, is clearly defined by its smaller yolk granules. This central region, together with the trail of fine reticulum to the periphery, constitute the latebra.

The great mass of yolk is laid down during the final growth period in such a way that the eccentricity of the latebra is preserved.

Riddle (1911), by feeding Sudan III to pigeons, found that the final period of rapid yolk secretion was characterized by an alternation of "white" and "yellow" yolk deposition in layers.

The ripening ovary of the pigeon is difficult to work with, because of its large size and the consequent difficulty of handling such large amounts of yolk in sections. For a study involving a great many sections of all types of follicles, the smaller ovary of the starling is much better.

VACUOLE FORMATION.

Under high powers of the microscope, after iron-hematoxylin-eosin, primordial follicles (about 0.037 mm. in diameter) in the adult ovary appear to consist of a germinal vesicle, or oöcyte nucleus proper, in cytoplasm which also contains thread-like inclusions (figs. 4, 17). These inclusions then appear to thicken and become more abundant throughout the egg cytoplasm. Near the center of the follicle, they seem to collect to form the yolk nucleus, a denser protoplasmic mass, with rays extending into the cytoplasm toward the periphery (figs. 5, 17). As the follicle develops, the yolk nucleus grows larger and spreads throughout the protoplasm. As to the extent of the spreading of yolk-nucleus material and the time and mode of origin of the peripheral zone, there appear to be at least two possibilities. One is that this yolk-nucleus material spreads throughout the cytoplasm of the follicle, till the whole follicle, with the exception of a thin zone next the granulosa layer, the peripheral zone, becomes completely invaded by this material of the yolk nucleus (figs. 6, 18). Another possibility is that the yolk-nucleus material spreads throughout the entire cytoplasm of the follicle at first, leaving no peripheral uninvaded zone, which appears later. The

first would account for the origin and method of formation of the peripheral zone very simply. The second requires the assumption that the peripheral zone occurs either (1) from the transformation of the material of the yolk nucleus at the periphery into a more soluble material which disappears into solution, (2) from its later withdrawal from that region, or (3) from secretions from the granulosa or surrounding elements.

In follicles of about 0.2 mm. diameter (figs. 7, 19), a peripheral zone is present and a clearing appears in the middle region of the oöcyte. This clearing is the beginning of what will be called the central zone. Clearings may occur first in small areas scattered throughout the material of the yolk nucleus and may expand till the material of the yolk nucleus, as such, has completely disappeared or cannot be distinguished from the central zone (fig. 8). At this stage, the protoplasm of the follicle is differentiated into two regions; the peripheral zone and the central zone (fig. 9). The latter shows as a lighter pink than the peripheral zone after iron-hematoxylin-eosin, and appears to be coarse in texture, as compared with the more homogeneous peripheral zone.

When the follicle has reached a diameter of about 0.5 mm., small vacuoles appear at the periphery of the central zone (fig. 10), probably containing lipoids dissolved out by the fixing agent or other reagents used, and apparently the forerunners of white yolk. This may be called "clear yolk." As the follicle develops, the vacuolation of the central zone proceeds from the periphery inward. On the inner side of the vacuoles already formed, toward the center of the follicle, new vacuoles appear in the central zone and begin to enlarge (fig. 11). Later, more vacuoles arise on the inner side of those already formed. When the central zone first becomes completely vacuolated, there is a gradation in size of vacuoles from the periphery toward the center of the follicle. The material studied suggests that this zone of vacuoles enlarges, and there appear in it concentric thin layers of vacuoles which increase in size at a slower rate than the vacuoles which comprised the original thick zone, now becoming separated into three or more thinner zones of large vacuoles, with zones of smaller ones between them (figs. 12, 20). This is the first stratification in the development of the follicle. In sections of some follicles, this stratification of vacuoles into zones is not very evident (fig. 22).

In late stages of vacuole formation and growth, there is apparently a tendency for the vacuoles at the periphery and those at the center of the follicle to become nearly equal in size, by differential growth. The peripheral zone gradually becomes thinner, either by the formation of small vacuoles on its inner side or by stretching of the zone as the follicle enlarges, without corresponding increase in amount of the homogeneous peripheral protoplasm of the zone.

WHITE YOLK

Foster and Balfour (1883) described white yolk as being composed of vesicles, 4 μ to 75 μ in diameter, with a highly refractive body or spherule, often as small as 1 μ in diameter, in the interior of each; and of large spheres, each containing a number of spherules, similar to the smaller refractive bodies. Blount (1909), as already mentioned, described white yolk as consisting of round granules. The vacuoles were described above as containing a fluid substance which we called "clear yolk." With the technique used, the contents of the vacuoles was probably dissolved out giving the follicle section a vacuolated appearance on the slide. The presence of granules within these vacuoles suggests that precipitation of the clear yolk substance takes place. Following Blount's terminology, round granules in these vacuoles will be referred to as "white yolk" (figs. 13, 23).

In a 1.66 mm. follicle from an ovary of April 3, minute granules, staining red with acid fuchsin and black with iron-hematoxylin, appear within these vacuoles near the peripheral zone. In an ovary of April 10, these granules are already present in follicles 1.01 mm. in diameter (figs. 13, 23). In one of April 20, they appear in a 0.9 mm. follicle. This indicates that the deposition of granules is not correlated with size of follicle; but with degree of development of the ovary as a whole.

The granules first appear at the outer part of the vacuolated central region, next the peripheral zone, and subsequently enlarge. In the meantime, on the inner side of the zone of granules first laid down, appears another zone of granules which also enlarge. This centripetal granule formation and enlargement is repeated many times. As the follicle develops and granules appear in all the vacuoles, those last formed, at the center of the follicle, are smallest. The large granules of the thick zones are separated by thin zones of small granules. At this stage a section of a follicle (figs. 14, 24) shows a thin layer of small granules next the remaining unvacuolated peripheral zone, and layers of large granules alternating with layers of slightly smaller ones, with the smallest granules of all at the center of the follicle. A 1.85 mm. follicle of an April 10 ovary is completely filled with white yolk and illustrates this tendency to layer formation among the white yolk granules very well. The peripheral zone thins out while small granules make their appearance in the small vacuoles of the central region next its inner border.

This account of the formation of these zones agrees with Hoffman's findings that the zones of the Lacerta egg are developed centripetally; while Riddle (pigeon) and many others are of the opinion that they develop centrifugally. In the starling ovary of April 3, the peripheral zone of the 14th follicle, in order of size, measures about 0.64 mm. in thickness. As

the follicle enlarges, this peripheral zone decreases to about 0.016 mm. in thickness in the largest follicle of this ovary. In the April 10 ovary, the thickness of the peripheral zone of the 14th follicle is about 0.48 mm. and this decreases, with the increase of follicle size, to about 0.006 mm. in the largest follicle of this ovary.

In many sections of follicles, a region of vacuoles appears in the outer border of the peripheral zone next the granulosa layer (fig. 23); but it is not possible to correlate this definitely with size of follicle or granule deposition.

In the three largest follicles of the April 3 ovary, white yolk granules appear as minute specks. In the April 10 ovary, the largest white yolk granules, in the follicle 14th in order from the largest one, are about 0.003 mm. in diameter. As larger follicles in this ovary are studied, these granules are found to be larger, until, in the largest follicle, the largest granules are about 0.016 mm. in diameter.

YELLOW YOLK

Balfour and Foster (1883) described yellow yolk as consisting of spheres, 25–100 μ in diameter, filled with numerous highly refractive granules. These spheres, when boiled or otherwise hardened in situ, assumed a polyhedral form. Blount (1909), in the pigeon's egg, distinguished two types of yolk; white yolk, consisting of spherical granules; and yellow yolk, of irregular polyhedral bodies. In keeping with their terminology, similar polyhedral bodies encountered in this study are referred to as "yellow yolk."

In sections of large follicles of the starling ovary, large white yolk granules are found in the vacuoles. When white yolk granules have reached a diameter of about 0.016 mm., the material in the vacuoles surrounding the granules apparently becomes sufficiently concentrated to withstand the dissolving action of the reagents used, and stains gray with iron-hematoxylin or blue with Mallory's triple stain (fig. 25). The outlines of the vacuoles, formerly somewhat rounded, then become irregular. The white granules break up into many smaller granules which form a mass, irregular in shape and eccentric in position in the vacuole (fig. 26). This eccentric irregular mass of small granules, so formed, stains red, while the rest of the vacuole becomes light blue with Mallory's stain. Vacuoles in this condition will be referred to as "transition forms." The large granule of white yolk may break up into two or more smaller granules, which do not form an irregular mass, eccentric in position in the vacuole, but become evenly distributed throughout the vacuole (fig. 16). These will also be referred to as "transition forms."

These smaller granules then break up into minute particles which become evenly distributed throughout the vacuole, which then stains black with iron-hematoxylin (fig. 15). After the complete dispersal of the particles,

the transition forms become the polyhedral bodies of yellow yolk. In sections lightly stained in Mallory's stain, the polyhedral bodies contain yellow particles distributed in a blue homogeneous substance (fig. 16). Riddle (1911) concluded that, in development, yellow yolk spherules may arise from spherules of white yolk and, in normal digestion and utilization of the yellow yolk spherule, it may be reconverted to white yolk.

In a follicle of 3.71 mm. diameter, from an April 20 ovary, next the greatly reduced peripheral zone, are a thin zone of white yolk granules and one of transition forms. Next to these is a thick zone of polyhedral bodies and then a thinner zone of transition forms. The central region of the follicle contains white yolk granules only (figs. 15, 27).

In a 5.55 mm. follicle from an ovary of the same date, from the periphery inward, there appear the following 8 regions (fig. 28); (1) a thin peripheral zone, (2) a thin zone of white yolk granules, (3) a thin zone of transition forms, (4) a thick one of polyhedral bodies, (5) a thick one of transition forms, (6) a thin one of white yolk granules, (7) a thick one of transition forms, and (8) a central region with white yolk granules.

In the two largest follicles of the April 20 ovary, there are three zones of yellow yolk polyhedral bodies, between which are zones of white yolk granules. The peripheral zone has diasppeared everywhere except in the blastodisc region. The arrangement of the zones in these follicles, from the periphery inward, is;—(1) peripheral zone, only in blastodisc region, (2) thin zone of white yolk granules, (3) thick one of polyhedral bodies, (4) thin one of white yolk granules, (5) thick one of polyhedral bodies, (6) thin one of white yolk granules, (7) thick one of polyhedral bodies, (8) central region filled with white yolk granules.

In these two follicles, evidently breakdown of white yolk granules has occurred, thinning the white yolk zones considerably; and transition forms have largely or wholly turned into yellow yolk polyhedral bodies, causing the almost complete disappearance of the zones of transition forms found in the 5.55 mm. follicle. These 8 zones are complete and concentric except in the region of the latebra, which consists of a thin region of white yolk granules extending from the center of the follicle to the blastodisc region. In early stages, the peripheral zone is of uniform thickness over all parts of the follicle, but, when white yolk is being formed, that part of the peripheral zone, which is to become the blastodisc region, becomes slower in its rate of thinning and persists in this region after it has disappeared in other regions.

In the latebra, the granules are fairly large centrally, but become smaller toward the periphery of the follicle in the blastodisc region, where the peripheral zone persists, with its inner part containing many small vacuoles with minute granules.

At this stage, the granulosa layer has disappeared or, at least, become

considerably reduced, so that its cells are imperceptible at the magnification used.

Parts of the above data are summarized in Table II and figure III.

SUMMARY AND CONCLUSIONS.

1. The normal spring changes in size and condition of ovarian follicles in (*Sturnus vulgaris*) the European Starling from December 7 to April 20 (just before ovulation) were studied.

2. A method was developed and described for the more accurate measurement of ovarian follicles rendered irregular in outline by the usual paraffin microtechnique.

3. December, February, and March ovaries have, respectively, three, four, and five different sets of follicles. April ovaries have follicles also in various stages of a sixth or final growth period.

4. The number of follicles falling in a set or class decreases as the size of follicle in the class increases, and the larger the follicles in a set, the greater are the variations in size among them.

5. From December 7 to March 25, the average rate of growth of the largest follicle is about 0.009 mm. increase in diameter per day. From March 25 to ovulation, the final growth period, after the follicle has reached a diameter of 1.65 mm., the average rate of growth of the largest follicle is about 0.285 mm. in diameter per day, about 31.6 times that of the preceding period.

6. (Stage 1) Primordial follicles (about 0.037 mm. diameter) contain the germinal vesicle and thin strands throughout the oögonial protoplasm (figs. 4, 17a). The strands then thicken and multiply throughout the protoplasm, and collect near the center of the follicle to form the yolk nucleus, a denser mass with rays extending into the surrounding protoplasm (figs. 5, 17b). In follicles from about 0.04 to 0.2 mm. in diameter, the yolk-nucleus material spreads throughout the protoplasm of the maturing germ-cell (figs. 6, 18).

7. (Stage 2) In follicles 0.2–0.5 mm. in diameter (figs. 7, 19), a clearing develops either in the central region or in small regions scattered throughout the material of the yolk nucleus (fig. 8) and expands until all of the material characteristic of the yolk nucleus has disappeared, leaving a central zone of clear substance surrounded by a homogeneous peripheral zone (fig. 9).

8. (Stage 3) In follicles from 0.5 to 1.20 mm. in diameter, from the April 3 ovaries, vacuolation begins at the periphery of the central zone and proceeds centripetally (figs. 10, 11).

9. (Stage 4) When the central zone has become completely vacuolated, alternate concentric zones of small and of larger vacuoles are apparent in sections. These are the result of unequal rates of growth of the vacuoles in

these zones, the smaller ones having grown less rapidly than the larger (figs. 12, 20, 21, 22). Finally, however, the zonation tends to disappear as the smaller vacuoles in one type of zone approach those of the other in size.

10. (Stage 5) The appearance of round granules within the vacuoles next the peripheral zone suggests that precipitation of the original substance or "clear yolk" takes place (figs. 13, 23). These precipitation granules are referred to as "white yolk." The fact that they appear in smaller follicles in more mature ovaries indicates that deposition of white yolk is not correlated with size of follicle directly, but with degree of development or maturity of the ovary as a whole.

11. (Stage 6) White yolk is laid down from the periphery inward, and, as in the cases of vacuoles, thick zones of large granules are separated by thin zones of smaller ones, with the smallest granules at the center of the follicle (figs. 14, 24). This indicates that the deposition of white yolk in a vacuole is related to the condition of the substance in it rather than to its size merely.

12. When white yolk granules have reached a diameter of about 0.016 mm., the material in the vacuole surrounding the granules becomes concentrated enough to stain (fig. 25). The granule loses its spherical form and either breaks up into many small granules, which mass together irregularly in an eccentric position in the vacuole (fig. 26), or breaks up into small granules evenly dispersed throughout the vacuole (fig. 16). These vacuoles are then referred to as "transition forms" between white and yellow yolk. Their small granules then break up into minute particles evenly distributed through the vacuoles which then become the polyhedral bodies of yellow yolk (fig. 16).

13. (Stage 7) Near the periphery and separated from it by a thin zone of white yolk granules and transition forms, appears a zone of polyhedral bodies of yellow yolk with a zone of transition forms on its inner side next the white yolk which fills the center of the follicle (figs. 15, 27).

14. (Stage 8) Then another thick zone of transition forms develops from white yolk farther toward the center of the follicle, separated from the polyhedral-body and transition-form zones, previously formed, by a thin zone of white yolk granules.

15. (Stage 9) In the two largest follicles of the April 20 ovary, are three concentric zones of yellow yolk polyhedral bodies separated by zones of white yolk granules. This results from conversion of transition forms into polyhedral bodies of yellow yolk.

16. As the follicle increases in size, its peripheral zone decreases and eventually disappears, except in the blastodisc region.

17. In follicles nearing ovulation, the granulosa layer either disappears

or becomes considerably reduced, so that it is not visible in sections after the technique used.

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PLATE VI.

Figures 4–16 are camera lucida drawings, others, photo-micrographs.

Fig. 4. Follicle showing germinal vesicle and thin strands in egg protoplasm in adult ovary. × 350.

Fig. 5. Follicle showing germinal vesicle, yolk nucleus, and thin strands in egg protoplasm, in adult ovary. × 350.

Fig. 6. Follicle showing material of yolk nucleus diffused throughout the egg protoplasm except in peripheral zone. × 350.

Fig. 7. Follicle showing clearing in center of material of yolk nucleus. × 70.

Fig. 8. Follicle showing the spread of the clear region throughout the material of the yolk nucleus. × 70.

Fig. 9. Sector of follicle showing peripheral and central zones. × 350.

Fig. 10. Sector of follicle showing vacuoles at periphery of central zone. × 350.

Fig. 11. Sector of follicle showing further vacuolation of central zone. × 350.

Fig. 12. Sector of follicle showing complete vacuolation of central zone and zones of large and smaller vacuoles. × 350.

Fig. 13. Sector of follicle to show white yolk granules in vacuoles at periphery of "egg." × 350.

Fig. 14. Sector of follicle showing tendency to formation of zones of larger and smaller granules. × 350.

Fig. 15. Sector of follicle showing zone of polyhedral bodies, zone of transition forms and white yolk granules. × 350.

Fig. 16. Part of section of follicle showing histological structure of one type of transition forms and polyhedral bodies of yellow yolk. × 350.

PLATE VII.

Fig. 17. Follicles showing (a) germinal vesicle and thin strands of egg protoplasm, (b) germinal vesicle, yolk nucleus, and strands in egg protoplasm. × 335.

Fig. 18. Material of yolk nucleus diffused throughout protoplasm of follicle except in peripheral zone; clearing beginning to appear in center of yolk-nucleus material. × 335.

Fig. 19. Clear region spreading throughout yolk-nucleus material in follicle. × 335.

Fig. 20. Zones of large and small vacuoles in vacuolated central zone of follicle. × 75.8.

Fig. 21. Zones of large and small vacuoles in part of follicle section. × 335.

Fig. 22. Section of follicle in which zones of large and small vacuoles are not evident. × 335.

Fig. 23. Part of section of follicle showing white yolk granules in vacuoles at periphery. × 335.

Fig. 24. Part of section of follicle showing tendency to form zones of large and small granules. × 335.

Fig. 25. Part of section of follicle showing deeply stained white yolk granules and remainder of vacuole less deeply stained. × 335.

Fig. 26. Transition forms in which minute particles collect into an irregular mass eccentric in position in the vacuole. × 335.

Fig. 27. Part of follicle showing zone of polyhedral bodies, zone of transition forms and white yolk granules. × 75.8.

Fig. 28. Part of follicle with zone of polyhedral bodies, zone of transition forms,

zone of white yolk granules, thick zone of transition forms and white yolk granules at center of follicle. × 75.8.

KEY TO FIGURES.

C.Z.	Central Zone.
GR	Granulosa
G.V.	Germinal Vesicle.
L.G.	Large Granules.
L.V.	Large Vacuoles.
P.Z.	Peripheral Zone.
S.G.	Small Granules.
S.V.	Small Vacuoles.
Th	Theca.
T.F.	Transition Forms.
T.I.	Threadlike Inclusions.
W.Y.	White Yolk.
Y.N.	Yolk Nucleus.
Y.Y.	Yellow Yolk.

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THE RELATION OF FEATHERING OF FEET OF AMERICAN OWLS TO HUMIDITY OF ENVIRONMENT AND TO LIFE ZONES.

BY LEON KELSO AND ESTELLE H. KELSO.

THE extent of feathering on the feet of American Owls varies from a more or less bare tarsus and entirely bare toes to a densely long-feathered tarsus and toes. The extent of this feathering is of interest to the naturalist as being apparently an adaptation for protection from cold, in the case of the long-feathered type. It is of importance to systematic ornithologists, who have used it as a key character for genera, subgenera, species, and subspecies.

Whether feathering is a protective adaptation or whether it is of phylogenetic significance are matters open to question. The purpose of the present paper is not to answer these questions, but to show the relationship, if any, of types of foot feathering to humidity and life zones. Previously, zones have usually been considered in connection with bird life as a whole, or with plant and animal life in general.

Method of Study. More than one type of foot feathering may be found in one genus, and even in one species, when such species is divided into subspecies e. g. Northern Barred Owl (*Strix v. varia*) with densely short-feathered toes, and Florida Barred Owl (*Strix v. georgica*) with toes mostly bare; Sartorius' Stygian Owl (*Asio stygius robustus*) with toes sparsely feathered, and Stygian Owl (*Asio s. stygius*) with toes bare. But only one type of toe feathering is found in one subspecies or in one species not divisible into subspecies. The subspecies and the undivided species are therefore used as the taxonomic unit in this study.

Type of foot feathering in Owls does not vary with age as some have thought. There is no proven instance, for example, of the young of any form having feathered toes and the adult having bare toes, or vice versa.

The feathering of the feet of the 192 forms of American Owls seems to fall roughly into 5 types:

1. *Toes and part of tarsus bare.* Tarsus bare of feathers all the way around for part or all of its length. Toes entirely bare of feathers. Forms with only hind side of tarsus bare, as in *Tyto* and *Speotyto*, are not considered a distinct type as this condition may be due to the bird's habit of frequently crouching with the tarsus flat to the ground. Examples: Cuban Bare-legged Owl (*Gymnasio lawrencii*), Chapman's Wood Owl (*Ciccaba aequatorialis*).

2. *Toes bare.* Tarsus fully feathered and at least half of sides and upper surface of toes bare of feathers. Examples: Choliba Screech Owl (*Otus choliba*), Florida Barred Owl (*Strix varia georgica*).

3. *Toes sparsely feathered or bristled.* Feathers or bristles somewhat

thinly distributed over most of upper surface and sides of toes. Examples: Screech Owl (*Otus asio asio*), Barn Owl (*Tyto alba*).

4. *Toes densely short-feathered.* The density of feathering much greater than in the preceding type, sufficient to hide most of upper surface of toes from view. Feathers short in comparison to size of bird, not tending to conceal part of claws. Examples: Great Horned Owl (*Bubo virginianus*), Short-eared Owl (*Asio flammeus*).

5. *Toes densely long-feathered.* Feathers long in comparison to size of bird, tending to conceal part of claws. Examples: Richardson's Owl (*Cryptoglaux funerea richardsoni*), Great Gray Owl (*Scotiaptex nebulosa*).

The systems of life zones used in this paper are those used by the majority of naturalists. It is realized that all do not agree on what names they should bear or on their exact delimitations.

The system used here for North America is that of Merriam, Bailey, Nelson and Preble;[1] for Central America, that used by Griscom;[2] for South America, that used by Chapman;[3, 4] Todd and Carriker;[5] and Hellmayr.[6]

Explanation of Table. In the accompanying table all the 192 subspecies and undivided species of American owls are tabulated according to the type of foot feathering they have and according to the life zones in which they nest. They are considered and tabulated according to only those zones in which they nest because owls may wander into any zone after the nesting season is over.

Under each zone are given the number of species and subspecies and the percentages of the owls in that zone having the various types foot feathering. Each form known to reside in each zone is included in the tabulation. To admit only those confined to one or two zones would leave out many forms entirely and make any relationship shown by the study seem of doubtful significance. The zonal limits of all forms are not known but it is believed that the percentages are approximately correct.

The numbers on the line following each type of feathering cannot add up to the totals in the last column because so many forms are found in more than one zone.

The figures concerning the bare toe and partly bare tarsus type of feath-

[1] Merriam, C. H., Bailey, V., Nelson, E. W., and Preble, E. A., Fourth Provisional Zone Map of North America, U. S. Dept. of Agriculture, Biological Survey, 1910.

[2] Griscom, L., The Distribution of Bird-Life in Guatemala, Bulletin of the American Museum of Natural History, Vol. LXIV, May 7, 1932, pp. 29–72.

[3] Chapman, F. M., The Distribution of Bird-Life in Colombia, Bulletin of the American Museum of Natural History, Vol. XXXVI, 1917, pp. 84–169.

[4] Chapman, F. M., The Distribution of Bird-Life in Ecuador, Bulletin of the American Museum of Natural History, Vol. LV, September, 1926, pp. 31–133.

[5] Todd, W. E. C. and Carriker, M. A., The Birds of the Santa Marta Region of Colombia, Annals of the Carnegie Museum, Vol. XIV, October, 1922, pp. 57–106.

[6] Hellmayr, C. E., Birds of Chile, Field Museum of Natural History, Zoological Series, Publication 308, Vol. XIX, June 13, 1932, pp. 21–23.

TABLE I

TYPES OF FOOT FEATHERING	ZONES												
	Paramo and Puna	Temperate	Subtropical	Tropical	Lower Austral	Lower Sonoran	Upper Austral	Upper Sonoran	Transition	Canadian	Hudsonian	Arctic	Total
Toes and part of tarsus bare	0	(4) 14.80	(2) 8.00	(4) 3.53	0	0	0	0	0	0	0	0	(8) 4.16
Toes bare	0	(8) 28.24	(9) 36.00	(40) 35.36	(2) 25.00	(1) 5.88	0	(1) 4.76	(1) 3.56	(1) 3.22	(1) 5.88	0	(53) 27.56
Toes sparsely feathered or bristled	0	(10) 35.60	(12) 48.00	(50) 44.32	(4) 50.00	(11) 64.72	(3) 37.50	(11) 52.40	(12) 42.88	(6) 22.54	0	0	(76) 39.68
Toes densely short-feathered	(3) 100.00	(6) 21.36	(2) 8.00	(19) 16.79	(2) 25.00	(5) 29.40	(5) 62.50	(9) 42.84	(14) 50.00	(19) 61.36	(10) 58.84	(1) 50.00	(48) 24.96
Toes densely long-feathered	0	0	0	0	0	0	0	0	(1) 3.56	(4) 12.88	(6) 35.28	(1) 50.00	(7) 3.64
Totals	(3)	(28)	(25)	(113)	(8)	(17)	(8)	(21)	(28)	(31)	(17)	(2)	(192) 100.00

ering are not included in the figures that concern the bare toe type although owls of both classes have bare toes.

Certain slight adjustments in the highest percentages were necessary because of discrepancies caused by the process of division.

Discussion of table. It will be noted in the table that none of the types of foot feathering in American Owls are confined to any one zone, nor are all types represented in any one zone.

The barest and most heavily feathered types of foot feathering are restricted to the more warm and humid and the more frigid zones, respectively. The 8 forms with the toes and part of the tarsus bare are associated with the warm and humid Tropical, Subtropical, and Temperate Zones of regions near the equator. Furthermore, they are found in only the humid portions of these zones. The 7 forms with tarsus and toes densely long-feathered, being residents of only the Transition (to a limited extent), Canadian, Hudsonian, and Arctic Zones, are associated with a cold environment.

The 53 forms with bare toes are represented in all except 3 of the 13 zones. They are more frequently associated, however, with the humid Temperate, Tropical and Subtropical Zones. In so far as known, all but one of the bare-toed forms of these zones are found resident in only the humid divisions, and not in the dry or desert divisions, of these zones.

The 76 forms with toes sparsely feathered or bristled are found in all but the 4 zones that have environment of lower temperature, the Paramo and Puna, Hudsonian, and Arctic Zones. They constitute 28 per cent or more of the Owl fauna of the zones in which they are represented, and have the highest percentage in 6 of the zones as well as in the totals for all the zones. Their highest percentages are in the arid Sonoran Zones. The 50 Owls of the Tropical Zone that have this type of feathering have a strong tendency to occupy a different type of environment than that occupied by the bare-toed group. We find that about 30 of these 50 are confined to the arid parts of the Tropical Zone. The remaining 20 are present in both the humid and arid parts of the Tropical Zone.

Of the 12 forms with sparsely feathered or bristled toes residing in the Subtropical Zone, 6 occupy the arid and 6 the humid parts of the zone.

The 48 forms with the toes densely short-feathered constitute the most widely distributed group. One or more of these forms are found in each of the 13 zones. The forms with this type of feathering constitute a larger percentage of the Owl family in the 4 colder zones than in the warmer zones. Therefore the dense and short type of feathering is associated with an environment which, in regard to temperature, is the antithesis of that occupied by the bare-toed forms. *Bubo virginianus*, which has the toes densely short-feathered, is represented by one or more of its subspecies in all the zones except the Arctic and the Puna. It may occasionally breed in

those. The length of the feathers of the feet varies from zone to zone. The Arctic Horned Owl (*Bubo v. subarcticus*) and St. Michael's Horned Owl (*Bubo v. algistus*) of the Hudsonian Zone have the foot feathers slightly longer. On some specimens the feathering is almost long enough to place them in a class with the toes densely long-feathered. The Montana Horned Owl (*Bubo v. pallescens*) chiefly of the Sonoran Zones and Oaxaca Horned Owl (*Bubo v. melancerus*) and Yucatan Horned Owl (*Bubo v. mayensis*) chiefly of the Tropical Zone have the toe feathers somewhat shorter.

The Long-eared Owl (*Asio wilsonianus*) of North America is found breeding from the Hudsonian to the Lower Sonoran Zone but is partial to the colder zones. Its toes are of the densely short-feathered type. This also is true of the closely related *Asio otus* of boreal Europe and Asia.

Their close neotropical relative, the Stygian Owl (*Asio stygius*) of the Tropical rain forests of Cuba, and southern Mexico to northern Argentina, has the toes bare, except in southern Mexico and Central America, where it has the toes very sparsely short-feathered.

Another owl of the short-feathered toe group that shows variation from zone to zone is *Asio flammeus*. The typical race of the Short-eared Owl has the toes densely feathered while the Colombian Short-eared Owl (*Asio f. bogotensis*) and the equatorial Short-eared Owl (*Asio f. aequatorialis*) of the humid Temperate and Paramo Zones near the equator, have the feathering more thinly distributed. Also, the Hispaniolan Short-eared Owl (*Asio d. domingensis*) and the Porto Rican Short-eared Owl (*Asio d. portoricensis*) of the Tropical Zone have the feathering of the toes thinner still. Beyond the equator in southern South America, where colder and less humid conditions prevail, we find the South American Short-eared Owl, *Asio f. suindus*, which has the toes as densely feathered as the boreal representative, which it resembles except for larger size and less black on the primary coverts.

The connection between humidity and foot feathering is further shown by *Strix varia*, which has the toes mostly bare in the Lower Austral Zone of the southeastern United States, while they are densely short-feathered in the Canadian, Transition, and Upper Austral Zones of southern Canada and northern United States, and in the Temperate Zone of the mountains of Mexico. The change from bare to feathered toes occurs near the place of transition from Lower to Upper Austral Zones.

The Rocky Mountain Screech Owl (*Otus asio maxwelliae*) has somewhat longer and denser foot feathering than the subspecies on either coast.

Examples outside the Americas. The above examples of correlation are not peculiar to the Americas. In the higher mountains of northern India, *Strix indranee newarense* has the toes densely short-feathered except near the ends. In the humid Malay Peninsula, *Strix i. maingayi* has the feathering shorter and more sparse. *Strix i. bartelsi* of Java is similar. *Strix*

leptogrammica of tropical Borneo, possibly only subspecifically distinct from the preceding, has the toes mostly bare. There are other examples.

Nearly all tropical forms of the genus *Otus* have bare toes. The following are bare-toed examples seen, with localities whence the specimens came: *Otus glabripes*, China; *japonicus*, Japan; *whiteheadi*, Philippines; *cuyensis*, Philippines; *menadensis*, Celebes; *rutilus*, Madagascar; *spilocephalus*, Malay, Borneo; *sunia*, Siam; *lempijii*, Java; *sagittatus*, Siam; *ballii*, Andamans; *rufescens*, Borneo; *bakkamoena*, India, Siam, Malay, and nearby islands.

The Fish Owls, *Ketupa* and *Scotopelia*, in keeping with their habitat and mode of life, have the toes and most of the tarsus bare.

Correlation with other characters. Along with reduction in toe feathering there is often a reduction in the size of the bird. This is true in such genera as *Bubo, Otus, Speotyto, Pulsatrix* and *Ciccaba. Strix varia* is an exception, the bare-toed *Strix v. georgica* not being appreciably smaller than the northern form. In some forms there is a corresponding reduction in the feathering of the facial rim and the facial disc. This is seen in the Vermiculated Screech Owl (*Otus vermiculatus*), Bare-legged Screech Owl (*Otus clarkii*), Crested Owl (*Lophostrix cristatus*), Burrowing Owl (*Speotyto cunicularia*), and in the Pigmy Owls (*Glaucidium*). Old world examples are *Bubo blakistoni, Bubo nipalensis, Bubo philippinensis, Bubo orientalis*, the forms of the genus *Ninox*, and many others.

Summary. The relationship of the feathering of the feet of American Owls to humidity and life zones indicated in the preceding table and discussion may be summarized as follows:

(a.) The bare toe and partly bare tarsus type is associated with the humid, warm environment of the Tropical, Subtropical, and Temperate Zones.

(b.) The densely long-feathered toe type is associated with the colder and less humid environment of the Arctic, Hudsonian, Canadian, and Transition Zones. Thus, extremes in foot feathering in American Owls seem to be associated with zones that have extremes of climate and humidity.

(c.) The bare-toed type is more frequently associated with the humid, warm environment of the Tropical, Subtropical and Temperate Zones.

(d.) The sparsely feathered or bristled toe type is well represented in all but the colder zones. In the Tropical, Subtropical, and Temperate Zones this type of feathering is more frequently associated with the arid parts of the zones. It constitutes the highest percentages in the Sonoran Zones and therefore tends to associate itself with aridity.

(e.) The densely short-feathered toe type is represented in all the life zones but includes a slightly higher percentage of the owl order in those zones which present a cooler environment, while in zones of greater heat and humidity it constitutes low percentages.

Washington, D. C.

THE FIFTY-THIRD STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.

BY T. S. PALMER.

FOR THE third time the Union met in Canada October 21–24, 1935, and held one of the largest and most successful meetings in its history. Headquarters were at the Royal York Hotel where the business sessions and the annual dinner were held. The public sessions were held in the theatre and lecture room of the Royal Ontario Museum.[1] Special bus service between the headquarters and the Museum proved a great convenience and assured prompt attendance at the sessions.

Business Sessions:—The meetings on Monday included three sessions of the Council, a meeting of the Fellows at 4 p.m., and a meeting of the Fellows and Members at 8 p.m. At the meeting of the Fellows E. A. Preble was elected to fill the single vacancy in the list, and at the evening meeting, attended by 23 Fellows and 23 Members, 7 Members were elected. The report of the Secretary showed a membership of approximately 2000, the Treasurer reported total receipts of $7,677.37, disbursements of $6,262.78, and a balance of $1,414.59 on hand September 30, 1935, while the report of the Trustees presented in detail the condition of the permanent funds of the Union.

The elections resulted in the addition of one Fellow, 7 Members, and 198 Associates. A. C. Bent was elected President for 1936, James P. Chapin, Vice President, A. O. Gross, an additional member of the Council, and the other officers for 1935 were reëlected for the ensuing year.

The business was confined chiefly to routine matters. The usual contribution was made to the Zoological Society of London in support of the Zoological Record and a report from the Committee on Revision of the By-Laws was received, fully discussed, and will come up for action at the next meeting. Appreciation of the numerous courtesies extended to the Union was expressed by the adoption of resolutions of thanks to the Chairman of the Board of Trustees of the Royal Ontario Museum to the Director of the Museum, and to the Local Committee on Arrangements.

At the invitation of the Carnegie Museum, Pittsburgh, Pa., was selected as the place for the next meeting to be held in October, 1936.

The 8th award of the Brewster Medal, given biennially for the most

[1] The Royal Ontario Museum is made up of 5 museums: Archaeology, Geology, Mineralogy, Palaeontology, and Zoology, each of which has its own staff and is in charge of its own director, who is a professor in the University of Toronto. It is both a University and a Public Museum. The Museum building was provided by the Province of Ontario but the Museum is maintained jointly by the Province and the University, and both are represented on the Board of Trustees.

meritorious work on American birds published during the preceding six years, was awarded to Herbert Lee Stoddard, of Thomasville, Ga., in recognition of the investigations embodied in his volume on 'The Bobwhite Quail, Its Habits, Preservation and Increase,' which appeared in 1931.

The Treasurer announced the receipt of a donation of $5000 from Mrs. Ruthven Deane in memory of her late husband who had been active in the affairs of the Union for half a century. This generous contribution will be known as the 'Ruthven Deane Fund' and the income from it will be used for publication of the 'The Auk.'

Public Meetings:—The public meetings opened on Tuesday morning with addresses of welcome by Dr. J. B. O'Brian, Chairman of the Board of Trustees of the Royal Ontario Museum, and by Prof. J. R. Dymond, Director of the Royal Ontario Museum of Zoology, and a response on behalf of the Union by Dr. Alexander Wetmore, Assistant Secretary of the Smithsonian Institution. A welcome on behalf of the City was extended by His Worship, James Simpson, Mayor of Toronto, and was followed by a response by the President of the Union.

The program was varied, stimulating, and well illustrated. The 67 papers, of which only two were read by title, included both technical and popular topics and required three double sessions for their presentation. On the opening day several of the papers dealt with local birds. One by L. L. Snyder on "Ontario and its Avifauna" served as an introducction to the ornithology of the Province and directed attention to the area of Ontario, which equals that of eight adjoining States from Maine to Minnesota. J. L. Baillie's account of 'The Bird Collection in the Royal Ontario Museum of Zoology' brought out the fact that this collection, which is both general and local, contains about 25,000 specimens and is one of the largest in Canada. Among other local papers were Mrs. O. S. Mitchell's interesting review of the Passenger Pigeon in Ontario and Saunders' discussion of the distribution of the Prairie Warbler in the Province.

Under the title '*Geospiza* in Life,' Chapin called attention to the fact that 1935 marked the centennial of Darwin's visit to the Galapagos and gave an intimate account of this peculiar group of birds based on his own observations made during a recent visit to the islands. Life history studies formed an important part of the program and included such species as the Least Bittern, Great Horned Owl, Yellow-headed Blackbird, Cowbird, House Wren and Tree Sparrow, while detailed studies of individual birds were summarized in Miss Oehlenschlaeger's 'Artificial Rearing of Purple Martin Nestlings,' Mrs. Wilson's 'Education of a Fledgling,' and Mousley's 'Birth of a Black Duck Family.'

Various phases of bird mentality were described by Christy with reference to Pigeons, by Grinnell with reference to California Jays and Wood-

peckers, by Hann and Mrs. Nice with reference to the Cowbird, by Myrus, who described the 'Injury-feigning Habit of the Semi-palmated Plover,' by Lyon, who utilized banded birds as the basis of his observations on the homing instinct, and by Mayr, who gave a general review of 'Recent Experiments in the Homing Abilities of Birds.'

New methods of making colored motion pictures by the kodachrome process were illustrated by Roberts under the title 'An Adventure in Kodachrome' and May's account of the Gannets of Bonaventure, while Sutton's paper on 'Coloration of Lantern Slides' contained directions for securing the best results in preparing still pictures for the screen.

In the technical sessions the status of several puzzling forms brought out some interesting discussions. Friedmann considered that *Gampsonyx*, placed by Ridgway near the Kites and by Peters near the Pygmy Falcons, should be replaced in the Milvinae. Johnson concluded that the so-called 'Ringed Murre' was not a separate species and that the white eye mark was merely an adult character. Fleming, with the aid of an extensive series of specimens, showed that Cory's Bittern is only a color phase of the Least Bittern, and Taverner discussing the various forms of Red-tailed Hawks concluded that *Buteo harlani* is probably a full species, while *B. krideri* is only a color phase and not recognizable as a subspecies. Todd and Wallace discussed the status of the Gray-cheeked Thrushes, and while apparently not reaching the same conclusions, each seemed to think that three forms should be recognized. Todd would revive the name *bicknelli* for the form breeding in the United States and reserve *minima* for the form breeding north of the Gulf of St. Lawrence. Wallace finds a large Newfoundland race which he thinks should be recognized and apparently regards *minima* as a winter specimen of *aliciae* but suggests that it be considered unidentifiable. The only paper on fossil birds was by Dr. Wetmore, who presented 'Notes on the Extinct Birds from St. Croix,' West Indies, based on 23 species which he identified in a collection of bird bones from that island. Migration received less consideration than usual but was discussed in Miss Cooke's 'Migration of the Eastern Evening Grosbeak' and Lewis' 'Migration of the American Brant.'

The status of disappearing species was described in three interesting papers by Kellogg on the Ivory-billed Woodpecker in Louisiana, Sprunt on the Great White Heron in Florida, and R. P. Allen on the Roseate Spoonbill. Sprunt reviewed in detail the havoc caused by the recent hurricane and estimated that not more than 200 Great White Herons were now left in southern Florida. Allen's report was more encouraging as he was able to detect a gradual increase and a total of about 3000 Roseate Spoonbills now in the southern United States.

Conservation received considerable attention. Bell outlined the recent

work of the Biological Survey under its enlarged program, Baker described the work of the National Association of Audubon Societies since its reorganization, and Pearson reviewed recent accomplishments in the field of international bird protection. Lewis summarized 'A Decade of Progress in the Bird Sanctuaries of the North Shore of the Gulf of St. Lawrence,' and Eaton, Allen, and Peterson discussed hawk and owl protection in New England and at Cape May, N. J.

The larger questions of present tendencies in ornithological work were outlined by Oberholser and Grinnell and reports were made on several recent expeditions, including Pettingill's visit to Grand Manan, May's visit to Bonaventure, A. M. Bailey's work in Florida and the West, and Sutton's account of the Semple Expedition to Brewster County, Texas. Cleaves showed pictures of the Pinchot Expedition to the South Pacific taken several years ago, Gross a series of interesting Arctic scenes made on the recent Bowdoin-MacMillan Expedition to the Button Islands in Hudson Strait. But the papers of most general interest were undoubtedly the reports illustrated by sound pictures of the Brand Cornell-American Museum Expedition to Florida and the Southwest. These accounts not only included important information concerning rare species but also the last word in the development of sound pictures.

Exhibits:—No effort was made to hold a general exhibit of bird paintings on account of the difficulty involved in arranging for shipments through the customs, but several interesting local collections of bird pictures and series of specimens representing Cory's Least Bittern and the various forms of the Red-tailed Hawks were shown. Mr. Fleming exhibited an interesting series of the principal editions of Gilbert White's 'Natural History of Selbourne,' illustrated by specimens of birds and mammals collected at Selbourne by R. Bowdler Sharpe. A number of paintings by three Canadian artists, William Pope, Allan Brooks, and T. M. Shortt, were shown, including a painting of the Passenger Pigeon by Pope, considered by some to be the best representation of the bird ever made. In the Archaeological halls of the Museum were also to be seen a number of specimens of oriental bird art, including figures of birds on Chinese bricks and tiles dating back to the third century B.C., and a series of drawings by eminent Japanese artists of the 18th and 19th centuries as well as by some of the present time. An interesting comparison might be made of the work of oriental bird painters with that of European artists of corresponding times.

Social Events:—Early arrivals at the meeting were the guests of Mr. and Mrs. Fleming at their home on Rusholme Road on Sunday evening and enjoyed an opportunity of examining the extensive collection of birds and some of the treasures in the library which include the incomparable collection of ornithological separates brought together by the late R. Bowdler Sharpe.

On Monday evening a dinner for the Fellows was given at the headquarters and on Tuesday evening an informal reception was held in the Royal Ontario Museum by the Board of Trustees when the members and visitors had an opportunity of becoming acquainted and of inspecting the excellent series of exhibits admirably arranged in the exhibit halls of the Museum. On Wednesday afternoon the ladies of the Union were invited to inspect the Museum exhibits of special interest to women and then to attend a tea in the Museum Tea Room at which Mrs. J. R. Dymond was hostess. Wednesday evening the annual dinner was held in the banquet hall of the Royal York, where 250 members and guests were present. After the dinner, special short talks were given beginning with a brief review of early Canadian collectors and a survey of present tendencies in ornithological work, followed in lighter vein by humorous reminiscences of the early days of the Union and closing with an illustrated account of an imaginary trip to an island in the South Pacific near Australia. Thursday evening although ostensibly left open for private arrangements was largely devoted to a showing of several reels of excellent moving pictures of wild life made available through the courtesy of the National Parks of Canada. Luncheon was served each day at Diana Sweets' about a block from the Museum.

Excursion:—A well attended field trip was arranged by the Local Committee and the Hamilton Bird Protection Society on Friday to see the wild fowl on Hamilton Bay and the bird-life on the Dundas Sanctuary about four miles west of the city of Hamilton. The party left the Royal York Hotel in buses about 9 a.m. and after one or two stops en route reached the Sanctuary two hours later. Here, under the guidance of competent leaders familiar with the locality, the various species were pointed out and brought within close range by the aid of a battery of telescopes set up along the shore. The Dundas Sanctuary includes about 4000 acres of water, marsh and upland, admirably located for a refuge and well protected. How successfully it is fulfilling its purpose may be judged by the number of birds which frequent it at various seasons. The birds most in evidence at this time were several species of gulls, ducks of 15 species and some shorebirds. The combined list of birds observed by the members of the party for the day numbered 61 species.

From the Sanctuary the party proceeded to Hamilton, where the members of the Union and their friends, about 100 in all, were the guests of the Hamilton Bird Protection Society at an excellent luncheon in the dining hall of McMaster University. After brief addresses by the President of the Society and one or two others, the party returned to Toronto about 3 p.m. Among those present was Prof. T. F. McIlwraith, grandson of Thomas McIlwraith who was one of the Founders of the Union and author of the 'Birds of Ontario.' After luncheon Prof. McIlwriath kindly con-

ducted a few of the members to the rooms of the Hamilton Scientific Association where the McIlwraith collection of mounted birds is preserved intact and in excellent condition. He aslo showed them through the old house near the shore, now a Children's Shelter, where his grandfather lived and did his bird work. On the way back he pointed out where the elder McIlwraith had observed warblers and shorebirds and where he had secured some of his record specimens. The visit to the McIlwraith home formed a fitting close of an eventful day, by linking activities of the present with those of the early days of the Union.

THE PROGRAM.

Papers are arranged in the order in which they were presented at the meeting. Those marked with an asterisk (*) were illustrated by lantern slides; those marked with a dagger (†) were illustrated by motion pictures.

TUESDAY MORNING.

Welcome by Dr. J. B. O'Brian, Chairman, Board of Trustees, Royal Ontario Museum.

Welcome by Professor J. R. Dymond, Director, Royal Ontario Museum of Zoology.

Response on behalf of the American Ornithologists' Union by Dr. Alexander Wetmore, Assistant Secretary, Smithsonian Institution.

Welcome by His Worship, James Simpson, Mayor of the City of Toronto.

Response on behalf of the American Ornithologists' Union by A. C. Bent, President of the Union.

Roll Call of Fellows and Members, Report of the Business Meeting, Announcement of the Result of Elections and Award of the Brewster Medal.

1. City Pigeons: A Study in Bird Mentality, BAYARD H. CHRISTY, Pittsburgh, Pa. (20 min.)
2. *Ontario and its Avifauna. L. L. SNYDER, Royal Ontario Museum of Zoology, Toronto, Ont. (10 min.)
3. The Bird Collection in the R. O. M. Z. J. L. BAILLIE, JR., Royal Ontario Museum of Zoology, Toronto, Ont. (10 min.)
4. Up-hill Planters. JOSEPH GRINNELL, Museum of Vertebrate Zoology, Berkeley, Calif. (15 min.)
5. †An Adventure in Kodachrome. T. S. ROBERTS, Museum of Natural History, University of Minnesota, Minneapolis, Minn. (20 min.)
6. *Present Status of the Great White Heron.[1] ALEXANDER SPRUNT, JR., Charleston, S. C. (20 min.)

TUESDAY AFTERNOON.

7. *A Decade of Progress in the Bird Sanctuaries of the North Shore of the Gulf of St. Lawrence. HARRISON F. LEWIS, National Parks of Canada, Ottawa, Ont. (15 min.)
8. Trends and Opportunities in Ornithological Work. HARRY C. OBERHOLSER, Biological Survey, Washington, D. C. (20 min.)
9. *The Movement for International Bird Preservation. T. GILBERT PEARSON, National Association of Audubon Societies, New York, N. Y. (20 min.)
10. **Geospiza* in Life. JAMES P. CHAPIN, American Museum of Natural History, New York, N. Y. (20 min.)

[1] Published in 'Bird Lore,' Nov.–Dec., 1935, pp. 405–411.

11. †A South Seas Voyage. HOWARD H. CLEAVES, Staten Island, N. Y. (45 min.)
12. †The Brand Cornell-American Museum Expedition. ARTHUR A. ALLEN, Cornell University, Ithaca, N. Y. (45 min.)

WEDNESDAY MORNING—GENERAL SESSION.

13. *Distribution of the Prairie Warbler in Ontario. W. E. SAUNDERS, London, Ont. (10 min.)
14. *The Eastern Least Bittern (*Ixobrychus exilis exilis*). LEWIS MCI. TERRILL, St. Lambert, Que. (30 min.)
15. *The Passenger Pigeon in Ontario. MRS. OSBORNE S. MITCHELL, Toronto, Ont. (20 min.)
16. *Numerical Distribution of Hawks and Owls with special reference to the New England States. WARREN F. EATON. National Association of Audubon Societies, New York, N. Y. (20 min.)
17. Eyes vs. Ears in Bird Study. STUART L. THOMPSON, Toronto, Ont. (10 min.)
18. *The Hawk Flight at Cape May Point, N. J. ROBERT P. ALLEN and ROGER T. PETERSON, National Association of Audubon Societies, New York, N. Y. (20 min.)
19. *Two Sixteenth Century Painters of American Birds [John White and Jacques Lemoine]. MRS. ELSA G. ALLEN, Ithaca, N. Y. (20 min.)
20. *A Discussion of the Status of the "Ringed" Murre. ROBERT A. JOHNSON, Cornell University, Ithaca, N. Y. (20 min.)
21. The European Goldfinch near New York City, 1915–1935. JOHN T. NICHOLS, American Museum of Natural History, New York, N. Y. (Read by title.)

WEDNESDAY MORNING—TECHNICAL SESSION.

22. *The Systematic Position of the Genus *Gampsonyx*. HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C. (5 min.)
23. Subspecific Appraisal of some Northwestern Birds. JOSEPH GRINNELL, Museum of Vertebrate Zoology, Berkeley, Calif. (15 min.)
24. Three Races of the Gray-cheeked Thrush? W. E. CLYDE TODD, Carnegie Museum, Pittsburgh, Pa. (10 min.)
25. Some Problems concerning the Nomenclature of the *Hylocichla minima* Group. GEORGE J. WALLACE, University of Michigan, Ann Arbor, Mich. (15 min.)
26. *Biological Rhythm in the Life Cycle of the Black Skimmer (*Rhynchops nigra nigra*). ALICE L. BROWN, Washington, D. C. (30 min.)
27. *Bird Life Zones in southern British Columbia. RUDOLPH M. ANDERSON, National Museum of Canada, Ottawa, Ont., (25 min.)
28. Differential Threshold of Reaction to Vitamin D Deficiency in Certain Birds. HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C. (10 min.)
29. *Some Observations on the Cerebral Cortex of Palaeognathine Birds and Suggestions as to their Phylogenetic Significance. E. HORNE CRAIGIE, University of Toronto, Toronto, Ont. (25 min.)

WEDNESDAY AFTERNOON—GENERAL SESSION.

30. Report on the 1935 John B. Semple Expedition to Brewster County, Texas. GEORGE M. SUTTON, Cornell University, Ithaca, N. Y. (15 min.)
31. †Breeding Birds of Cobb's Island, Virginia. LESTER L. WALSH, National Association of Audubon Societies, New York, N. Y. (20 min.)

32. *Impressions of Grand Manan Bird Life. OLIN S. PETTINGILL, JR., Westbrook Junior College, Portland, Me. (15 min.)
33. †The Kent Island Research Station, N. B. WILLIAM A. O. GROSS, Bowdoin College, Brunswick, Me. (40 min.)
34. †The Gannets of Bonaventure in Color Movies. JOHN B. MAY, Cohasset, Mass. (30 min.)
35. †Camera Studies of Western Birds. ALFRED M. BAILEY, Chicago Academy of Sciences, Chicago, Ill. (45 min.)
36. †The Injury-feigning Habit of the Semi-palmated Plover. A. A. MYRUS, Cornell University, Ithaca, N. Y. (10 min.)

WEDNESDAY AFTERNOON—TECHNICAL SESSION.

37. *Recent Experiments in the Homing Abilities of Birds. ERNST W. MAYR, American Museum of Natural History, New York, N. Y. (10 min.)
38. *Sunspots and Grouse. R. E. DELURY, Dominion Observatory, Ottawa, Ont. (10 min.)
39. *Speciation in African Montane Avifaunas. W. RUDYERD BOULTON, Field Museum of Natural History, Chicago, Ill. (20 min.)
40. The Standing of Cory's Least Bittern (Exhibition of specimens). JAMES H. FLEMING, Royal Ontario Museum of Zoology, Toronto, Ont. (20 min.)
41. *Notes on Extinct Birds from St. Croix. ALEXANDER WETMORE, Smithsonian Institution, Washington, D. C. (10 min.)
42. An Outline of the *Buteo borealis* Complex (Exhibition of specimens). PERCY A. TAVERNER, National Museum of Canada, Ottawa, Ont. (15 min.)

THURSDAY MORNING—GENERAL SESSION.

43. An Analysis of Breeding and Non-breeding Populations in the House Wren. S. CHARLES KENDEIGH, Western Reserve University, Cleveland, Ohio. (20 min.)
44. *Birth of a Black Duck Family (*Anas rubripes tristis*). HENRY MOUSLEY, Montreal, Que. (20 min.)
45. †The Artificial Rearing of Purple Martin Nestlings. ELIZABETH A. OEHLENSCHLAEGER, Milwaukee, Wis. (10 min.)
46. *Sex and Age Studies of Wintering Tree Sparrows. A. MARGUERITE HEYDWEILLER, Cornell University, Ithaca, N. Y. (20 min.)
47. The Education of a Fledgling. MRS. ETTA S. WILSON, DETROIT, MICH. (15 min.)
48. *The Courtship of the Flightless Cormorant (*Nannopterum harrisi*) in Captivity. MALCOLM DAVIS, National Zoological Park, Washington, D. C. (Read by title.)
49. †The Present Status of the Roseate Spoonbill in the United States. ROBERT P. ALLEN, National Association of Audubón Societies, New York, N. Y. (20 min.)
50. *Observations on the Nesting and Home Life of the Great Horned Owl. FREDERICK M. BAUMGARTNER, Cornell University, Ithaca, N. Y. (20 min.)
51. *Home Life and Mortality of the Yellow-headed Blackbird in Northwestern Iowa. GEORGE A. AMMANN, University of Michigan, Ann Arbor, Mich. (20 min.)
52. *Coloration of Lantern Slides. GEORGE M. SUTTON, Ithaca, N. Y., and OLIN S. PETTINGILL, JR., Portland, Me. (10 min.)

THURSDAY MORNING—SPECIAL SESSION.

53. *The Breeding Relations of the Cowbird and the Ovenbird. HARRY W. HANN, University of Michigan, Ann Arbor, Mich. (25 min.)
54. The Cowbird in Central Ohio. MRS. MARGARET M. NICE, Columbus, Ohio. (15 min.)
55. *The Migration of the Eastern Evening Grosbeak. MAY T. COOKE, Biological Survey, Washington, D. C. (20 min.)
56. *Notes on the Migrations of the American Brant (*Branta bernicla hrota*). HARRISON F. LEWIS, National Parks of Canada, Ottawa, Ont. (20 min.)
57. Notes on Research and Conservation Programs. WILLIAM B. BELL, Biological Survey, Washington, D. C. (20 min.)
58. *Some Aspects of the Distribution of the Breeding Birds of Ohio. LAWRENCE E. HICKS, Ohio State University, Columbus, Ohio. (20 min.)
59. Bird Protection and the National Association of Audubon Societies. JOHN H. BAKER, National Association of Audubon Societies, New York, N. Y. (15 min.)
60. Economic Ornithology and the Correlation of Laboratory and Field Methods. CLARENCE COTTAM, Biological Survey, Washington, D. C. (20 min.)
61. Notes on Birds of the Southern Oceans. C. C. DIXON, Toronto, Ont. (10 min.)
62. A Hawk Census in Ontario. L. H. BEAMER, Meaford, Ont. (10 min.)

THURSDAY AFTERNOON.

63. *Homing Instincts of Birds. WILLIAM I. LYON, Waukegan, Ill. (20 min.)
64. †The Bowdoin-MacMillan Expedition to the Button Islands, Hudson Strait. ALFRED O. GROSS, Bowdoin College, Brunswick, Me. (45 min.)
65. †Recent Observations on the Ivory-billed Woodpecker. PAUL KELLOGG, Cornell University, Ithaca, N. Y. (45 min.)
66. †Some Birds of Florida and Louisiana. JAMES T. TANNER, Cornell University, Ithaca, N. Y. (40 min.)
67. †Sex Rhythm in the Lesser Prairie Chicken. ARTHUR A. ALLEN, Cornell University, Ithaca, N. Y. (30 min.)

ATTENDANCE.

The 1935 meeting was the largest held in Canada and one of the largest ever held by the Union. The register showed the presence of 1 Patron, 23 Fellows, 31 Members, 138 Associates, and about 140 visitors, making a total of approximately 330.

This was the fourth meeting at which no Founders were represented, but two Fellows were present who were elected at the first meeting 52 years ago. California was represented by three members, Oregon by one, Puerto Rico by one, and British Columbia by two. Representatives were present from 23 States, the District of Columbia, Puerto Rico, and six Provinces of Canada.[1] As a record of the meeting a group photograph was taken on Wednesday and included 202 members and visitors.

[1]There were also present W. K. Lawler, of Balboa Heights, Canal Zone, and William and Margaret R. Knox, of Indiana.

ALBERTA, 1—*Associate*, A. C. Twomey, Camrose.

BRITISH COLUMBIA, 1—*Member*, J. A. Munro, Okanagan Landing.

MANITOBA, 2—*Member*, J. D. Soper, Winnipeg; *Associate*, A. H. Shortt, Winnipeg.

NOVA SCOTIA, 2—*Associates*, R. W. Smith, R. W. Tufts, Wolfville.

ONTARIO, 55—*Fellows*, J. H. Fleming, Toronto; Hoyes Lloyd, P. A. Taverner, Ottawa; W. E. Saunders, London; *Members*, R. M. Anderson, H. F. Lewis, Ottawa; J. L. Baillie, Jr., L. L. Snyder, Toronto; *Associates*, F. A. Banfield, H. H. Brown, S. C. Downing, O. E. Devitt, F. H. Emery, H. K. Gordon, W. H. H. Gunn, Paul Harrington, C. E. Hope, C. D. Howe, R. V. Lindsay, D. A. MacLulich, W. C. Mansell, E. G. McDougall, T. F. McIlwraith, Mrs. O. S. Mitchell, C. E. G. Moloney, G. H. Richardson, R. J. Rutter, R. M. Saunders, D. M. Scott, T. M. Shortt, R. A. Smith, S. L. Thompson, Toronto; L. H. Beamer, Meaford; E. L. Brereton, Barrie; R. C. Brooman, Waterloo; R. E. De Lury, Mrs. Hoyes Lloyd, Miss Lulu Kealy, W. H. Lanceley, Miss H. P. McGahey, A. D. Nelles, A. E. Porsild, Ottawa; C. H. D. Clarke, Goderich; Eli Davis, C. G. Watson, London; W. E. Hurlbut, D. A. Ross, Vineland; G. W. Knechtel, Kitchener; H. H. Krug, Chesley; W. H. Lunn, Hillier; Mrs. F. E. MacLoghlin, G. W. North, Hamilton; Miss E. L. Marsh, Clarksburg; R. W. Sheppard, Niagara Falls; R. D. Ussher, King.

QUEBEC, 8—*Member*, Henry Mousley, Montreal; *Associates*, J. A. De Carie, W. S. Hart, Mrs. Harold Hibbert, A. C. Nicol, V. C. Wynne-Edwards, Montreal; Rex Meredith, Quebec; L. M. Terrill, St. Lambert.

CALIFORNIA, 3—*Fellow*, Joseph Grinnell, Berkeley; *Associates*, Dirk Benson, Ukiah; Mrs. Joseph Grinnell, Berkeley.

CONNECTICUT, 1—*Associate*, Mrs. E. A. Hayes, New Haven.

DISTRICT OF COLUMBIA, 17—*Fellows*, Herbert Friedmann, A. H. Howell, F. C. Lincoln, H. C. Oberholser, T. S. Palmer, E. A. Preble, Alexander Wetmore; *Members*, Miss M. T. Cooke, Clarence Cottam; *Associates*, C. H. M. Barrett, W. B. Bell, Miss A. L. Brown, A. J. Duvall, Mrs. J. S. Elliott, R. B. Horsfall, Mrs. T. S. Palmer, G. M. Wright.

FLORIDA, 1—*Associate*, J. C. Howell, Orlando.

ILLINOIS, 6—*Patron*, Mrs. Ruthven Deane, Winnetka; *Members*, A. M. Bailey, Rudyerd Boulton, Chicago; S. S. Gregory, Jr., Winnetka; W. I. Lyon, Waukegan; *Associate*, E. R. Ford, Chicago.

IOWA, 1—*Associate*, P. L. Errington, Ames.

KENTUCKY, 1—*Associate*, C. P. Grant, Covington.

MAINE, 2—*Fellow*, A. O. Gross, Brunswick; *Associate*, W. A. O. Gross, Brunswick.

MARYLAND, 1—*Associate*, W. C. Henderson, Chevy Chase.

MASSACHUSETTS, 4—*Fellow*, A. C. Bent, Taunton; *Members*, F. H. Kennard, Newton Centre; J. B. May, Cohasset; *Associate*, O. S. Pettingill, Jr., Middleton.

MICHIGAN, 10—*Fellow*, Josselyn Van Tyne, Ann Arbor; *Associates*, G. A. Ammann, Pierce Brodkorb, H. W. Hann, G. J. Wallace, Ann Arbor; David Dolese, W. H. MacCracken, Mrs. E. S. Wilson, Detroit; Mrs. E. K. Frey, Jackson; M. J. Magee, Sault Ste. Marie.

MINNESOTA, 1—*Fellow*, T. S. Roberts, Minneapolis.

NEW JERSEY, 4—*Members*, B. S. Bowdish, Demarest; C. H. Rogers, Princeton; *Associates*, W. F. Eaton, Montclair; L. L. Walsh, Ridgewood.

NEW YORK, 38—*Fellows*, A. A. Allen, Ithaca; J. P. Chapin, J. T. Zimmer, New York; *Corresponding Fellow*, Ernst Mayr, New York; *Members*, A. R. Brand, White Plains; Verdi Burtch, Branchport; Mrs. E. M. B. Naumburg, T. G

Pearson, R. T. Peterson, New York; James Savage, Buffalo; Dayton Stoner, Albany; *Associates*, Mrs. A. A. Allen, A. D. Amadon, F. M. Baumgartner, F. B. Hutt, Paul Kellogg, W. D. Sargent, Ithaca; R. P. Allen, J. H. Baker, W. W. Naumburg, Wm. Vogt, New York; C. M. Beal, Jamestown; C. S. Beardslee, Kenmore; Mrs. A. R. Brand, White Plains; H. H. Cleaves, Prince Bay; C. E. Cummings, H. D. Mitchell, A. R. Shadle, Buffalo; Miss A. M. Heydweiller, Rochester; G. E. Hix, Brooklyn; R. A. Johnson, A. A. Myers, Oneonta; R. H. Lefevre, Miss K. A. Schenck, Snyder; A. R. Phillips, Scarsdale; C. J. Spiker, Branchport; J. T. Tanner, Cortland; N. E. Wyckoff, Newfield.

NORTH CAROLINA, 1—*Associate*, E. R. Greene, New Holland.

OHIO, 12—*Fellows*, S. P. Baldwin, F. H. Herrick, Cleveland; *Members*, Mrs. M. M. Nice, Columbus; S. C. Kendeigh, Cleveland; *Associates*, R. D. Book, Corning; H. W. Brandt, Cleveland; G. M. Cook, Youngstown; J. C. Hambleton, L. E. Hicks, Columbus; W. C. Herman, K. H. Maslowski, Cinncinati; J. A. Reis, Jr., Wooster.

OREGON, 1—*Associate*, K. L. Gordon, Corvallis.

PENNSYLVANIA, 11—*Fellows*, Witmer Stone, Philadelphia, W. E. C. Todd, Pittsburgh; *Member*, B. H. Christy, Sewickley; *Associates*, F. L. Bacon, Mrs. Witmer Stone, S. A. Tatnall, Philadelphia; N. J. McDonald, Media; A. W. Robinson, Haverford; J. B. Semple, Sewickley; Miss Ruth Trimble, Pittsburgh; H. T. Underdown, Elkins Park.

PUERTO RICO, 1—*Associate*, J. A. Smyth, San Juan.

SOUTH CAROLINA, 1—*Member*, Alexander Sprunt, Jr., Charleston.

TENNESSEE, 1—*Member*, A. F. Ganier, Nashville.

VERMONT, 1—*Associate*, W. P. Smith, Wells River.

VIRGINIA, 1—*Fellow*, W. L. McAtee, Cherrydale.

WEST VIRGINIA, 1—*Member*, G. M. Sutton, Bethany.

WISCONISN, 3—*Associates*, Miss E. A. Oehlenschlaeger, C. S. Jung, Milwaukee; Miss I. M. Schwandt, Wauwatosa. Total 193.

COLLEGES, UNIVERSITIES AND MUSEUMS REPRESENTED AT THE MEETING.

COLLEGES AND UNIVERSITIES, 15—Bowdoin, Cornell, Iowa State College, McMaster University, McGill University, Ohio State University, Princeton, University of Buffalo, University of California, University of Michigan, University of Minnesota, University of Pennsylvania, University of Toronto, Western Reserve University, and Westbrook Junior College, Portland, Me.

MUSEUMS, 18—Academy of Natural Sciences of Philadelphia, American Museum of Natural History, Baker-Hunt Museum of Covington, Ky., Boston Society of Natural History, Carnegie Museum, Chicago Academy of Sciences, Cleveland Museum, Field Museum, Manitoba Museum, the Museums of Cornell, University of Michigan, University of Minnesota and Princeton University, Museum of Vertebrate Zoology, National Museum of Canada, N. Y. State Museum, Royal Ontario Museum of Zoology, and the U. S. National Museum.

ELECTION OF OFFICERS.

The election of officers for 1936 resulted as follows: President, A. C. Bent; Vice-Presidents, Herbert Friedmann and James P. Chapin; Secretary T. S. Palmer; Treasurer, W. L. McAtee. Members of the Council (in addition to officers and ex-presidents) A. A. Allen, J. P. Chapin, A. O. Gross, H. C. Oberholser, W. H. Osgood, T. S. Roberts, and P. A. Taverner.

The Council elected Witmer Stone, Editor of 'The Auk'; W. L. McAtee, Business Manager; George H. Stuart, 3d, C. B. Riker and Edward Norris, Trustees; and A. C. Bent, S. S. Gregory, Jr., Ludlow Griscom, W. L. McAtee, and T. S. Palmer, members of the Finance Committee.

ELECTION OF FELLOWS, MEMBERS AND ASSOCIATES.

FELLOW—1.

Edward Alexander Preble, Washington, D. C.

MEMBERS—7.

James Little Baillie, Jr., Toronto, Ont.
Albert Rich Brand, White Plains, N. Y.
Walter John Breckenridge, Minneapolis, Minn.
Hildegarde Howard, Los Angeles, Calif.
Aldo Leopold, Madison, Wis.
Roger Tory Peterson, New York, N. Y.
Dayton Stoner, Albany, N. Y.

ASSOCIATES—198.

The names of Associates who have qualified will appear in 'The Auk' for April, 1936.

DECEASED MEMBERS.

During the year the Union lost 24 members by death—1 Fellow, 1 Corresponding Fellow, 1 Member and 21 Associates.

HARRY SCHELWALD SWARTH,[1] Fellow, died in his 58th year at Berkeley, Calif., Oct. 22, 1935.

JOHN DAVID DIGUES LATOUCHE, Corresponding Fellow, died in his 74th year at sea en route from Majorca to Ireland, May 6, 1935.

CHARLES JOHN PENNOCK,[2] Member, died in his 78th year, at Kennett Square, Pa., Aug, 20, 1935.

EDWIN CONRAD ANDERSON, Associate, died in his 50th year at Dell Rapids, S. Dak., Dec. 26, 1933?

MRS. CLARENCE AKIN ASPINWALL, Associate, aged 56, died at Washington, D. C., Dec. 24, 1934.

EDWARD HERBERT ATHERTON, Associate, of Jamaica Plain, Mass., died Aug. 1935.

DAVID GALBRAITH BAIRD,[3] Associate, died in his 83d year at Beverly, N. J., July 24, 1935.

WALTER BEICK, Associate, died in Edsin-Gol, China, March 25, 1933.

GEORGE BARTLESON BENNERS, Associate, aged 64, died at Philadelphia, Pa., Dec. 14, 1934.

MRS. FREDERICK THOMPSON BICKNELL, Associate, aged 79, died at Los Angeles, Calif., June 17, 1934.

MURRAY THOMPSON DONOHO, Associate, aged 70, died at Baltimore, Md., Aug. 29, 1935.

CLYDE ERNST EHINGER, Associate, died in his 77th year, at Keokuk, Ia., Jan. 3, 1935.

CHARLES WILLIAM HENRY ELLIS,[4] Associate, aged 84, died at Washington, D. C., Jan. 11, 1935.

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[1] For obituary notice, see Auk, LIII, p. 128.
[2] " " " " " LII, pp. 488–489.
[3] " " " " " " p. 492.
[4] " " " " " " p. 493.

MIRIAM LOUISE GAUL, Associate of Chicago, Ill., died 1935.

FRANK HARRIS HITCHCOCK,[1] Hon. Life Associate, died in his 66th year near Tucson, Ariz., Aug. 5, 1935.

FRANK EDWARD LEMON, Associate, died in his 76th year at Reigate? England, Apr. 22, 1935.

MRS. EFFIE KEARNEY LITTLE (MRS. LEWIS GARRISH LITTLE) Associate, aged 68, died near Lowell, Ind., Jan. 1935.

ARTHUR AUGUSTUS OSBORNE, Associate, died in his 54th year at Peabody, Mass., Apr. 24, 1935.

HENRY SMITH OSLER,[2] Associate, aged 71, died at Montreal, Can. Dec. 8, 1933.

GEORGE DUPONT PRATT,[3] Associate, aged 65, died at Glen Cove, L. I., N. Y., Jan. 20, 1935.

MRS. MARY HARRIMAN RUMSEY, Life Associate, aged 50, died at Washington, D. C., Dec. 18, 1934.

JAMES SPEAR JR., Associate, died at Philadelphia, Pa., 1934.

GARDNER PERRY STICKNEY, Associate of Milwaukee, Wis., aged 74, died Feb. 1935.

WILLIAM HENRY TROTTER, Associate, aged 64, died at Philadelphia, Pa., Nov. 8, 1933.

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[1] For obituary notice, see Auk, LII, pp. 490–491.
[2] " " " " " LIII, p. 128.
[3] " " " " " LII, p. 493.

REPORT OF THE COMMITTEE ON BIRD PROTECTION AMERICAN ORNITHOLOGISTS' UNION.

DURING the past year there have been both favorable and adverse action relative to bird protection, but withal it has been a year when wild life protection has been brought to the public's attention as never before. Emergency activities of the Government have resulted in some marsh restoration, and some purchase and development of refuges. Unfortunately this advance has been offset to some extent by renewed activities in reclamation, mosquito control, and control of rodents and predators, accomplished in most cases with the aid of unskilled labor and directed by persons with little knowledge of the needs of bird life, and consequently producing results that have been disturbing to conservationists.

Fortunately better supervision is being given to Conservation-Corps activities, and the needs of wild life are receiving greater consideration than heretofore. In clean-up operations wild life technicians of the agencies involved now determine in advance what effect a particular project may have on wild life, and require that some dead trees be left as habitations for birds and mammals. Past experience has shown that wild life habitats may be injured severely by CCC activities, and protectionists must keep watchful eyes on this otherwise worthwhile enterprise so that injurious practices may be reduced to the minimum.

The chief bird protection problem has pertained to water-fowl. Actual estimates by the Biological Survey indicated the lowest supply in history. Even shooters themselves were frightened enough to admit the need for a reduced kill. Bird protectionists stood almost solidly for a closed season. Without holding the usual meeting of the Advisory Board of the Migratory Birds Treaty Act, the Government officials issued regulations that provide for a month's open season in each of two zones, a slight reduction in bag limit, and that include new limitations on automatics, and prohibitions on live decoys, batteries, sink boxes, and baiting. A closed season was not promulgated, on the ground that the loss of funds to be derived from the state licenses and from the sale of federal duck stamps would result in seriously crippling law enforcement. The use of emergency funds to offset this condition was suggested, but these were not made available. Although the prohibition of live decoys and of baiting, batteries and sink boxes, and the load limitation on repeating guns are items of real progress, your committee feels that restrictive measures to reduce the kill have not been as drastic as the situation requires.

Particularly heartening have been the tangible results of the restoration program. Some eight and one half million dollars made available to the

Biological Survey are being expended in the purchase of land and in the creation of marshes and ponds as breeding and feeding grounds for wild fowl. Red Rock Lakes just west of Yellowstone National Park have been acquired; and better assurance follows that the Trumpeter Swan may now be saved from extinction. This is typical of the fine progress made in creating refuges and restoring suitable resting and breeding areas. However, this restoration program cannot be counted on to restore wild fowl to their former numbers since only about 15 percent of the wild fowl with us during the hunting season have been reared in the United States. It is obvious, therefore, that, along with the restoration program, must go such limitation upon hunting and such protection as to permit a larger number of birds to return to their breeding grounds in the north.

Also to be reported is the unfortunate situation of the White Pelican colony on Great Salt Lake. This, the largest of the three or four major colonies of the continent, moved this spring, from one island to another and began nesting there. Most of the young died, apparently from shortage of food consequent upon changed water conditions on their feeding grounds. This situation again emphasizes the need for additional protection for this species, which has shown dangerous decrease in numbers for some years past. Your committee is convinced that this is one of the protection problems most needing attention.

By coöperative agreement the nesting colonies of Terns and other seabirds on the Dry Tortugas (now Fort Jefferson National Monument) and the Marquesas Islands off the southern tip of Florida are to have additional custodial care to prevent poaching and disturbance. The Coast Guard Service has been asked to lend assistance on this law-enforcement program.

Most of the Everglades area of Florida, breeding ground for water-birds, and now a proposed national park, thanks to the efficacy of the Audubon Association (working on a basis of better laws) has become a complete refuge. There are few places where Herons and Ibises nest in such large colonies, and total state protection for the breeding grounds is a noteworthy accomplishment that has been furthered by the prospect of park status.

Although Congressional committees were appointed and discussions were held regarding the best type of legislation to prevent oil polution, no committee report has been made, and the actual framing of a bill has been delayed. The only bill presented in Congress, and that during its last days, was one amending the old Act of 1899 so as to include all types of waste, of liquid nature as well as solid. It is hoped that when another year has passed we may be able to report on steps actually taken to eliminate the menace to birds that is created by oil and other types of water pollution.

The National Association of Audubon Societies taking over the activities of the Hawk and Owl Society has redoubled its efforts on behalf of these

sadly misestimated birds; it has sponsored legislation to give better protection to the Bald Eagle, our national bird; and, along with several other conservation organizations, has championed a closed season for Ducks. It is apparent that this important bird-protection organization has grasped the opportunity to take a stronger position in the conservation cause.

Aid has been given by the Audubon Association to the project of stopping the shooting of Hawks at Hawk Mountain, Pennsylvania, that is sponsored by the Emergency Conservation Committee. This organization by leasing the land and by placing a custodian in charge made it possible for the 11,000 Hawks that passed the point to go unmolested.

Noteworthy as parts of the educational campaign of the Audubon Association have been the issuance of Dr. May's volume on 'The Hawks of North America' illustrated in color, and the distribution of protection posters, and of numerous news releases. Opposition to state bounty bills has helped to defeat several. Bounty systems, we are sorry to learn, are still operative in Pennsylvania (on the Goshawk) in Delaware, in Oklahoma, and (by counties) in a few other states. Wisconsin's law relative to Hawks and Owls was amended, so as to restore protection to beneficial species.

The killing of migrating Hawks at Cape May, New Jersey, presents a different problem from that at Hawk Mountain. It is estimated that 60,000 hawks arrive during migration and that about 5,000 are killed, largely Sharp-shinned Hawks. Progress has been made in obtaining better supervision of hunting at this point with resultant better protection for beneficial species.

We are glad to note that the National Association of Audubon Societies, with the coöperation of the New Jersey Audubon Society, has leased a strategic portion of woods near Cape May Point and established there the Witmer Stone Wild Life Sanctuary, named in honor of that distinguished ornithologist and editor of 'The Auk' who has made a life-long study of the birds of Cape May County. A warden has been appointed and the New Jersey Board of Fish and Game Commissioners has offered coöperation in law enforcement.

New information has been obtained from certain localities that indicates widespread use of steel traps set on poles to catch predatory birds around game farms and elsewhere. Investigation has shown that the Owls chiefly caught are the Barn Owl, and the Short- and Long-eared Owls, birds, which seldom if ever, are destructive to anything but rodents. Great Horned Owls (whose destruction might seem more readily to be justified) are seldom caught. Furthermore, Marsh Hawks, Red-tails, and Sparrow Hawks are caught in numbers, while Sharp-shinned and Cooper Hawks are seldom taken. There is plenty of evidence that such birds as Mockingbirds, Cardinals, and Bluebirds also have fallen victims in these localities. Your com

mittee condemns the use of pole traps, which break the legs and leave the birds hanging head down until they die, as being cruel and as non-selective, thus causing destruction of many innocent birds.

Information has been received that the old-time practice of "firelighting" woodcock is still followed in Louisiana. In early days a torch, nowadays an electric flash, carried through the woods enables the hunter to catch the "eyeshine" of Woodcock with resultant undue slaughter. Here is another hunting method that should be broken up. Apparently it is illegal, but, as in many other cases, the law is not enforced.

Several members of the Bird Protection Committee have spoken of noticeable decrease in the number of Baltimore Orioles. Certain it is that many orchard and shade trees that once harbored nesting Orioles now lack them. Similar decreases seems to have occurred in the cases of other orchard-nesting birds, such as Bluebirds and Vireos. More evidence is needed to confirm such casual observations. The extensive use of poisonous sprays with resultant poisoning of insects may or may not be involved. Starling interference may be a factor. At any rate, it would be helpful to know more about this situation, and members of the Union are urged to gather evidence.

An awakening to needs and responsibilities in conservation is evidenced in editorials and magazine articles. A new publication called 'Conservation' has appeared, designed as a digest of conservation articles for the busy conservationist. Also a new effort is being made to draw all wild life conservation organizations together for a joint Congress. A tentative date has been set for the first week in February and Washington has been chosen as the place, and invitations will be issued to all organizations concerned. A more effective advance in conservation could be made if widely scattered organizations could be brought together to present a common front on matters of major importance.

During the year your committee urged favorable action on the move to stabilize by law the nature-education activities in Palisades Interstate Park, and the continuance of the Jones Beach Bird Sanctuary, and the committee expressed opposition to extensive drainage, patently injurious to bird habitats, occasioned by mosquito-control operations.

Respectfully submitted,

H. C. BRYANT, *Chairman* — B. H. CHRISTY
MRS. F. M. BAILEY — E. A. PREBLE
A. C. BENT — W. E. SAUNDERS

GENERAL NOTES.

The Fulmar (Fulmarus glacialis glacialis) in Maine.—In 1906 the Boston Society of Natural History issued a circular of five printed pages, as 'A List of Desiderata of New England Mammals and Birds'; at page 5 of this sheet, under a heading, "Birds Represented by Only One Specimen" appears the following record: "Fulmar (*Fulmarus glacialis* Linn.). Male. Maine." This appears to be the first published record of the bird for this state. As soon as it came to my attention, I wrote Dr. Glover M. Allen, asking more particulars, and offering the suggestion that he publish such other data as were available. In 1908 Dr. Allen published a note under the title of, "Fulmar in Maine"[1] in which he gave these data: "The bird is catalogued as No. 508 collection of the Society, from the coast of Maine, March 1879, from G. O. Welch. No further data are at present available."

Overlooking this record, the late E. H. Forbush reports another instance in the following sentence. "There is an indefinite record of a Fulmar taken in Maine some 12 years ago, which was mounted for the owner by C. Emerson Brown. . . . unfortunately all data of this specimen are missing."[2]

In a note mailed in Philadelphia October 30, 1935, Mr. Brown writes me that he remembers having mounted a Fulmar many years ago while he was in Boston, but he has forgotten the particulars.

A third specimen of this bird, a male in the dark phase of plumage was shot by Joseph Card, at French's Island Ledges, in Casco Bay, Maine, early in October, 1906. This bird was received at the shop where it was mounted, in Portland, October 5, 1906, having been shot but a day or so previously. Mr. Card informed me that the bird flew over his Sheldrake decoys while he was gunning at the ledges named.

This specimen was acquired by Dr. Henry H. Brock of this city, and with his collection was recently presented to the Portland Society of Natural History.—Arthur H. Norton, *Museum Natural History, Portland, Maine.*

Food Capturing Tactics of the Least Bittern.—Many of us who attended the Chicago meeting of the American Ornithologists' Union, in 1934, were thrilled by motion pictures of a dark-colored species of African Heron which showed the bird capturing its food by progressing across the marshlands afoot in a series of rapid forays, crouching abruptly between each sally, throwing its widespread wings so far forward that they actually overlapped, and snatching up such aquatic creatures as (presumably) were so unfortunate as to seek shelter under the tent-like 'haven of refuge' thus created for them.

Last summer I observed food capturing tactics of our own Least Bittern (*Ixobrychus exilis*), which reminded me of those dark-colored African Herons. Early on August 7, 1935, my friend Mr. Lawrence Camburn and I rowed round Bass Lake, a marsh-rimmed body of water not far from the Edwin S. George Wild Life Reserve, in Livingston County, southeastern Michigan. The morning was damp, calm, and gray. A thin mist hung over the cat-tails, sedges and fringe of alders.

In a little cove we chanced to come upon an adult male Least Bittern which, being intent upon capturing food, was moving stealthily along the water's edge, grasping the cat-tail stalks with his big feet, slipping across the ferny hummocks, pausing to peer into the water with his bright yellow eyes. As he walked he frequently spread one wing quickly forward, then stood still, looked intently at the water, thrust the

[1] 1908, Allen, G. M., Journ. Maine Orn. Soc. X, 116.
[2] 1925, Forbush, Bds. Mass. I, 136.

wing out again, moved stiffly forward, and with a thrust of his sharp beak caught some small fish or aquatic insect that apparently had been frightened from its hiding place by the flicking of the bird's wing. Sometimes he put both wings forward at the same time, as if about to fly off. After we had watched him for ten minutes or more we decided that this wing-flicking was no chance mannerism but a definite part of a food-securing campaign. A little surprised that we could not recall having read of such a habit we were at the point of thinking it an individualism when, suddenly, and not far away, we caught sight of two more Least Bitterns, a male and a female, pursuing food in exactly the same way. We watched the birds for a long time. Since we had a good binocular we were able to check our observations again and again.

The birds were catlike in their behavior. Their eyes gleamed fiercely as they watched the water while flicking their wings. As they waited for their prey they held their tails sharply downward and swung them rhythmically and rather rapidly back and forth, almost *lashing* them, to use a term that instantly comes to mind in describing cat-like behavior.

I regret that we did not learn just what these birds were capturing. It is quite likely that in pursuing other sorts of food other tactics are customarily employed.—George Miksch Sutton, *Cornell University, Ithaca, New York.*

The Roseate Spoonbill in South Carolina.—On September 12, 1935, an adult Roseate Spoonbill (*Ajaia ajaja*) was seen at Price's Creek, Sewee Bay, Christ Church Parish, S. C., by Mr. Edward M. Moore, Junior Refuge Manager of the Cape Romain Federal Bird Refuge.

The bird was in the marshes in company with fourteen Wood Ibises (*Mycteria americana*), and was seen and studied at a range of about fifty yards. In the summer of 1934 a marsh-man of the Romain area reported to Mr. Moore that he had seen a large pinkish bird with a bill like a Shoveller Duck's in the marshes of Bull's Island Narrows. This could hardly have been anything else than a Spoonbill, and ever since that time Mr. Moore has been on the look-out for the species.

Since the days of Audubon and Bachman, the Spoonbill has been taken twice in South Carolina, one by Dr. T. G. Simons in Lucas Mill Pond in the city of Charleston in June, 1879, and the other near Yemassee by Mr. Eugene Gregorie in the fall of 1885. The writer is indebted to Mr. Moore for the privilege of recording this rare species.—Alexander Sprunt, Jr., *Supervisor Southern Sanctuaries National Asso. Audubon Socs., Charleston, S. C.*

Whistling Swan (Cygnus columbianus) in Eastern New York.—On November 4, 1935, a Whistling Swan was shot by a hunter on the Mohawk River near Schenectady, N. Y. It was brought to the writer, a taxidermist, for mounting, and since specimens of this bird from eastern New York are rare it seems desirable to put this capture on record.

The bird was a young male, bill flesh color, head and neck gray and remainder of plumage white washed with gray in a few places. The feet were dark gray and there were twenty tail feathers.

Identification was confirmed by Dr. Dayton Stoner, State Zoologist, who now has the skin.—Joseph Janiec, *Schenectady, N. Y.*

The Blue Goose Again in Coastal South Carolina.—Atlantic coast records for *Chen caerulescens* always being of interest, I would record that, on November 7, 1935, an immature Blue Goose was seen by the writer and Mr. Edward M. Moore, on

Bull's Island, a part of the Cape Romain Federal Bird Refuge. We were investigating wildfowl on Summerhouse Pond, and the Goose was noted among them.

Initial approach was made to within fifty feet, as the bird sat on the water and it was studied at length with and without glasses, then flushed. Early on the morning of the 8th, we were again in the pond and saw the Goose first at no more than twenty-five foot range and surprised it among some cat-tails at hardly more than ten feet. At this time the pinkish legs were plainly visible. On the afternoon of the 9th, the writer saw it again from some distance.

On November 13, with Mr. Clarence Cottam, of the Biological Survey, the bird was seen again and allowed approach to within fifty feet before flying. It always called a single time as it rose.

In 'The Auk' (vol. LII, p. 439) Mr. Cottam lists the occurrence of *Chen caerulescens* in South Carolina in his compilation of records for that species on the Atlantic seaboard during the winter of 1934. It is interesting to note that the birds listed by him occurred at exactly the same time of year as the above specimen, i.e., November 3 to 13. The Bull's Island bird gave every indication of being perfectly at home and only flew a short distance before alighting. The pond is well supplied with a growth of widgeon grass, sago pond-weed and banana water-lily. The Goose has now been there for a full week.—ALEXANDER SPRUNT, JR., *R. F. D. No. 1, Charleston, S. C.*

Turkey Vulture Carrying Food.—The letter of Mr. Gordon W. Jones in the General Notes department of 'The Auk', of October 1935 (page 444), brought to mind two instances of food carrying by this species that have been observed by the writer. In both cases the food was carried in the beak instead of the feet.

Many years ago I saw a Turkey Vulture, when frightened away from a carcass, carry in its bill what appeared to be a piece of intestine about a half yard long. I have no written record of this occurrence.

I quote the following from my field notes written at the time the observation was made, dated June 16, 1930. While driving on route 38 in the east end of the county (Amelia County, Va.) I saw a Turkey Vulture pecking at a small object in the road ahead. As I approached it seized the object in its bill and flew down the road about fifty yards before dropping it. The object proved to be a fully grown box turtle (*Terrapene carolina* Merrem) that had been crushed by an automobile.—JOHN B. LEWIS, *Amelia, Va.*

The Turkey Vulture's Ability to Carry Food in its Beak.—Mr. Gordon W. Jones's "Note on the Turkey Vulture" which appeared in the October, 1935, issue of 'The Auk' (p. 444) prompts me to state that during my boyhood residence at Fort Worth, Tarrant County, Texas (1911–1914), I several times saw Turkey Vultures (*Cathartes aura teter* Friedmann) flying about carrying large-sized objects in their beaks—in one instance a snake; again what I took to be a spermophile; and again a considerable part of the carcass of a young jack rabbit. The bird that was carrying the rabbit appeared to be doing its best to elude several other Vultures. It eventually dropped its burden and the hungry birds descended to tear the rabbit to pieces.—GEORGE MIKSCH SUTTON, *Curator of Birds, Cornell University, Ithaca, New York.*

Turkey Vultures Possible Victims of an Automobile.—The note by Gordon W. Jones in 'The Auk,' for October, 1935, in which he recounted his observation of a Turkey Vulture (*Cathartes aura septentrionalis*) feeding on a snake which had been

killed by a passing motorist, brings to my mind the observation of two of these birds which I believe had been struck and killed by a passing automobile. I found the two Vultures lying beside the paved road near the top of a little knoll about two miles east of Warrenton, Va., on October 27, 1934. One bird was on one side of the road and the other was opposite; between them lay the carcass of a rabbit. It is my belief that these birds, intent on devouring the rabbit, had been struck by a speeding auto which came up over the knoll so suddenly and unexpectedly that they could not escape.—CHAS. J. SPIKER, *Branchport, N. Y.*

The Rough-legged Hawk in the North Carolina Mountains.—In Pearson and Brimleys' 'Birds of North Carolina, *Buteo lagopus sanctijohannis* is included as follows: "Recorded by Cairns as occasionally seen in winter and spring in Buncombe County. Besides this, our only record is from Blowing Rock, Watauga County, near which place one was seen on September 10, 1908 . . . by Z. P. Metcalf."

On August 14, 1935, the writers saw, and watched for nearly two hours, two of these birds on Flat-top Mountain, at Blowing Rock. They were first noted in a wide meadow, some half mile from the summit of the mountain which reaches an altitude of 4550 ft. From that point on to the observation tower at the summit, the birds were in sight from time to time, and once one of them passed over a break in the trees at no more than fifty feet above us. From the tower, views of both birds were obtained from above and below and all sides. They were hunting a long ridge, which is topped by the summit of Flat-top.

Every characteristic of the species was noted except the flapping while hovering. Both of them hovered many times, but because of the uprush of air above the peak, did so on motionless wings. The plummet like drops perpendicularly from the point of hovering were frequently indulged in. Both birds kept up an almost constant high-pitched "kree-e-e-e" call. So close did they approach the tower that several times the beak was seen to open when the call was uttered. The white patch at the base of the tail was much lighter in one of the birds than in the other, and in both, the blackish belly band was broken with streaks of whitish. No finer views could have been obtained. The birds remained for the whole of our stay at the top, and we saw them going down. Dr. Murray saw one of them two days later in the same spot.

August 14 is an exceptionally early date, nearly a month prior to the Metcalf record mentioned above, the locality being the same. The writers have worked the Blowing Rock region in summer for many years past, but this is their first observation of the species though Sprunt is familiar with it in other localities.—ALEXANDER SPRUNT, JR., *Charleston, S. C.;* JAMES J. MURRAY, D.D., *Lexington, Va.*

The Prairie Falcon (Falco mexicanus), in Indiana.—A Prairie Falcon was captured in Sullivan County, Indiana, about thirty miles south of Terre Haute, January 9, 1932, by a student of State Teacher's College. It was brought alive to Prof. William P. Allyn of the Zoology department of Indiana State Teachers' College in that city. He kept it about a month when it died, after a treatment of sodium fluoride for lice. He gave it to Mr. Sidney R. Esten, then of the Indiana State Department of conservation, Indianapolis. Mr. Esten made a skin of it and preserved the specimen. I know of no other record of this species for Indiana. At Prof. Allyn's request I am making this record.—AMOS W. BUTLER.

Eggs of Megapodius pritchardi from Ninafou Island, Tongan Group.—The recent acquisition by the California Academy of Sciences of three eggs of *Megapodius pritchardi* from Ninafou Island (more popularly known as Tin Can Island), Tonga

Islands, seems to be worthy of record, in view of the rarity of these eggs in collections especially those of North American institutions.

The eggs were presented to this museum by Capt. Frank A. Johnson, master of the SS. *Mariposa*, a vessel which in the course of its voyage between San Francisco and Sydney lies off to Ninafou Island to pick up mail. On the occasion of her call in July, 1935, a friend on the island sent out to Captain Johnson, as an interesting novelty, three eggs of *Megapodius pritchardi*. The eggs had evidently been newly collected, for they were still in good condition when they reached the museum on August 28. When they were blown they showed only a slight trace of incubation. In color the three differ considerably. One is pale pinkish cinnamon,[1] another is light vinaceous-cinnamon, and the third light onion-skin pink. They measure (in millimeters) as follows: 75.5 x 45.0; 76.25 x 43.0; 74.5 x 45.5.—M. E. McLellan Davidson, *California Academy of Sciences, San Francisco, California.*

Sex and Resistance of Bob-whites and Ring-necked Pheasants to Starvation.—In the course of wild life studies the past few years, we have met with a certain amount of opinion to the effect that some gallinaceous species are subject to differential sex mortality during periods of winter crisis. Insofar as winter food shortage may mean serious emergency for the Bob-white (*Colinus v. virginianus*) and Ring-necked Pheasant (*Phasianus colchicus torquatus*) populations in north-central states environment, the following data on these two species may be of some interest.

We have dying weights of fifty-one starved Bob-whites, mainly Wisconsin birds but some from Iowa and Missouri. These birds died during winter weather that was comparatively mild as a whole (1930–33) and were either birds picked up as intact carcasses in the wild, or were captives that succumbed in connection with experiments. Of the 51 birds, 27 were cocks and died at an average of 113 gr.; 24 were hens dying at an average of 113.7 gr.

In a series of drastic but not necessarily lethal experiments (intended primarily to test the nutritive qualities of questionable winter foods), no significant difference in ability of one sex or the other to maintain weight was observed. Eleven important experimental lots contained Bob-whites of both sexes (28 cocks and 17 hens), and practically all exceptionally high loss rates shown by the individual records are more convincingly explained on grounds other than sex.

Full weight Wisconsin specimens taken from early winter to mid-winter, 1930–'32, averaged 197.9 gr. for 35 cocks and 192.2 gr. for 21 hens, but it is highly probably that a larger series of birds would reveal scarcely any weight differences between sexes. H. L. Stoddard (The Bob-white Quail, 1931, p. 74), for example, gives 165.11 gr. as the average weight for 475 winter cocks in the Thomasville-Tallahassee (Georgia-Florida) region and 164.87 gr. as the average for 413 hens.

We have insufficient data on Pheasants starving in the wild to draw many conclusions, but the data from a number of food experiments conducted in cooperation with the Iowa Fish and Game Commission during the winter of 1932–33 may be of significance.

The Pheasants used in the experiments were of game-farm origin and were lighter in weight than birds collected from the wild. Eighteen fully-fleshed game-farm cocks averaged 1132 gr. and 46 hens averaged 877 gr., compared with an average of 1266 gr. for 68 wild cocks and 934 gr. for 13 wild hens.

During the experiments, 9 cocks died of starvation at an average of 594.3 gr. or at 52.5% of their original full weight. Similarly, 27 hens died at an average of 482 gr.

[1] The capitalized names of colors are those of Ridgway's *Color Standards*, 1912.

or at 54.9% full weight. Variations in temperature did not appear greatly to affect dying weights (unpublished).

Eleven of the sixteen food experiments having an adverse effect on the Pheasants used had to do with both cocks and hens. Comparisons were always made of the loss rates of the two sexes in the same experimental lots. This eliminates variations in losses brought about by differences in diet, air temperature, time of weighing, etc., as all of the birds in each lot were kept and handled under conditions as nearly identical as possible. Differences in physical condition of the birds themselves introduce a degree of error into the calculations, but for purposes of conciseness these may best be neglected for the present.

Comparing the average daily losses, lot by lot, we find that of 18 cocks and 46 hens, 11 or 61.1% of the cocks and 25 or 54.3% of the hens lost at rates not differing materially from the rates of opposite sexes in the same experiments. The daily loss rates were computed in terms of percentage of full original weight lost, for the obvious reason that a 50 gr. loss by a 1300 gr. cock is not in all ways comparable to a 50 gr. loss by a hen weighing but 800 gr.

Only 1 or 5.5% of the cocks lost at a decidedly more rapid rate than members of the opposite sex in specific experiments, compared to 18 or 39% of the hens. Six or 33.3% of the cocks and but 3 or 6.5% of the hens lost at rates decidedly lower.

Cock Pheasants, then, seemingly show somewhat more resistance to hunger than the smaller hens. The Bob-white, which has not the pronounced sexual dimorphism of the Pheasant, loses weight from hunger at rates which are not appreciably influenced by sex.

In the event of differential sex mortality in winter Bob-white populations, we may reasonably suspect the operation of factors other than straight starvation, unless the evidence ultimately points in a different direction than it does now. But while Pheasant cocks may not have a tremendous advantage over hens in subsisting on scant fare, even a comparatively slight advantage may conceivably have enough winter survival value under marginal or emergency conditions to result in a predominately cock population by spring.—PAUL L. ERRINGTON, *Iowa State College, Ames, Iowa.*

Cuban Snowy Plover (Charadrius n. tenuirostris) in Wisconsin.—Temporarily on deposit at the Chicago Academy of Sciences is the collection of Mr. Walter Weber who permits me to report the specimen it contains of a Snowy Plover taken by him in Kenosha County, Wis., June 1, 1934. It is a male in full plumage. Compared with specimens of western birds in the collection, the color above appears to be nearly snow white. Hence it is ascribed to *tenuirostris*. Except the record by Fleming of its appearance in Ontario there seems to be no other report of this species from the Great Lakes region.—E. R. FORD, *Chicago Academy of Sciences, Chicago, Ill.*

Continued Wintering of the Long-billed Curlew on the South Carolina Coast.—In 'The Auk,' (vol. L, p. 215), the writer recorded the farthest north winter record for *Numenius americanus americanus* on the Atlantic coast. It is interesting to note that, for the two winters succeeding that observation, this species has wintered in the same locality. Seen first in January, 1933, on the U. S. Wild Life Refuge at Cape Romain, S. C., they have occurred there in the winter of 1933–34 and 1934–35. The numbers are few, about five to seven birds being seen, but they remain from early December certainly through February, making a three months period. They could hardly have been overlooked before, and it seems to indicate an increased occurrence of the species northward along the coast in winter. Several have been

noted at the Savannah River Entrance in the past few years by Mr. Ivan R. Tomkins. —ALEXANDER SPRUNT, JR., *R. F. D. No. 1, Charleston, S. C.*

The White-rumped and Stilt Sandpipers in Southern South Carolina.—On October 20, 1935, I collected a White-rumped Sandpiper (*Pisobia fuscicollis*), and a Stilt Sandpiper (*Micropalma himantopus*), on the mainland of South Carolina close to the Savannah river, and about seven miles east of Savannah. I am not certain of any other records nearby, and this is apparently the third South Carolina record of *himantopus*, and a third fall record of *fuscicollis*.

The two birds were feeding in shallow water with some Lesser Yellow-legs and Red-backed Sandpipers.—IVAN R. TOMKINS, *U. S. dredge "Morgan," Savannah, Ga.*

The Ruff in Grenada, B. W. I.—At Point Saline, Grenada on July 31, 1935, I obtained a male Ruff (*Philomachus pugnax*), in immature plumage. There are three records of the occurrence of this European straggler in Barbadoes, but I find no other definite West Indian records.—STUART T. DANFORTH, *University of Puerto Rico, Mayagüez, Puerto Rico.*

The Migration of North American Shorebirds to New Zealand.—Several species of North American *Limicolae* have occurred in Australia and New Zealand, and many of the records have, as far as I can see, been completely ignored in all American works of reference.

Limosa haemastica. HUDSONIAN GODWIT.—First recorded by Buller in his supplement to the Birds of New Zealand, 1905, page 24, from a specimen taken at Lake Ellesmere by Edgar F. Stead in 1903, the Hudsonian Godwit has been taken so often in New Zealand since that its occurrence is obviously more than accidental.

On a recent visit to New Zealand I looked up some of the records to make sure the birds were not the small form of the Black-tailed Godwit (*Limosa limosa melanuroides*) that is found in eastern Asia and which reaches Australia (but not New Zealand) in its southern migrations. I did not see all the Hudsonian Godwits that have been collected in New Zealand but the following were verified:

One male, Lake Ellesmere, 1 January 1918. Collection E. F. Stead, winter plumage, summer feathers coming in on lower breast.

Two females, Lake Ellesmere, March 5, 1921, and December 31, 1917. Canterbury Museum, Christchurch. Both in full winter plumage. Mounted.

One, not sexed, no visible data, Dominion Museum, Wellington, winter plumage, mounted.

All of these have the measurements of *haemastica* with blackish axillars, not white as in *melanuroides*. There are other New Zealand records including Buller's original one that I did not see, but the bird is something more than accidental according to the observations of Mr. Stead who deserves all the credit for recording this and other American Shorebirds for New Zealand.

The species occurs with its congener the Pacific Godwit (*Limosa lapponica baueri*) an abundant migrant to New Zealand. Mr. Stead's theory is that individuals become associated with flocks of Pacific Godwits in Alaska and follow them down to New Zealand. This seems very plausible and is probably the solution of this extraordinary migration.

Against this theory is the fact of the rarity of the Hudsonian Godwit in Alaska, however, it may be more common there than records indicate. It may be as well to record here the first record of the species for British Columbia, a male in full summer plumage taken at Atlin in the northwestern corner of the province by Ronald M. Stewart, 7 May 1932. It was accompanied by another, probably a female.

Pisobia melanotos. PECTORAL SANDPIPER.—To Mr. Stead also belongs the credit for establishing this as an irregular migrant to New Zealand in rather fewer numbers than its congener the Sharp-tailed Sandpiper (*Pisobia aurita*). In his collection are four skins all taken by himself at Lake Ellesmere in February, 1910, "It was common that year." In the museum at Christchurch there are two others taken at Lake Ellesmere, March 6, 1927 and January 1, 1922. There are additional records for New Zealand and in the Museum at Melbourne there is a skin taken at Albany, West Australia, in 1910, the same year that the species was common in New Zealand. This is as far as I know the first record for Australia, the specimen is labeled *Erolia acuminata* but it is a typical Pectoral Sandpiper in winter plumage.

In winter plumage the Pectoral and Sharp-tailed Sandpipers are very much alike, both have the fore-neck grayish and thickly streaked with blackish; in the Sharp-tail the markings tend to cordate and sagitate shapes and extend to the flanks and even to the center of the abdomen; in the Pectoral the dark markings are narrow shaft streaks only, the flanks are almost immaculate and the rest of the lower surface is entirely so.

The shaft of the first primary is wholly white in the Pectoral and white with a brownish base in the Sharp-tail.

The young in first plumage and adult in summer of the Sharp-tailed Sandpiper are easily distinguished from the Pectoral by color alone, the former has hardly any markings on the foreneck which is deep buff.

As both species occur on the west coast of America these characters should be born in mind.

Lake Ellesmere where so many Limicoline records have been made is situated on the east coast of the South Island of New Zealand.

It does not appear to be especially adapted to shore birds, there are many better looking localities such as Kaipara on the North Island, which if worked as Mr. Stead has worked Lake Ellesmere would undoubtedly yield material that would throw more light on the extraordinary migrations of North American shorebirds to New Zealand.—ALLAN BROOKS, *Okanagan Landing, British Columbia.*

Early Migration of the Great Black-backed Gull.—During recent years it appears that the Great Black-backed Gull has been increasing in numbers and has been extending its range. Perhaps because of this increase these birds may be seen on their wintering grounds earlier than usual. Like many other water birds, they become more nomadic at the close of the breeding season. According to the A. O. U. 'Check-list' the species normally winters only as far south as Delaware Bay, where it ordinarily arrives early in November.

It was somewhat surprising, therefore, to find an individual (an adult) on September 28, 1935, as far south as the vicinity of Ocean City in southern New Jersey in Cape May County. Dr. Witmer Stone informs me that he saw four adults on Gull Bar off Anglesea, N. J., a few miles farther south on the same day! These constituted his earliest record for Cape May County.—CLARENCE COTTAM, *Biological Survey.*

Laughing Gull in the North Carolina Mountains.—On August 18 and 19, 1935, Mrs. Alexander Sprunt, Mrs. Murray and I saw an immature Laughing Gull (*Larus atricilla*) at a rain pool on a golf course at Blowing Rock, Watauga County, N. C. The dusky head, dark breast, black primaries, white band at the back of the wing, and light tail with black subterminal band and narrow white tip served to identify it. Pearson and the Brimleys ('Birds of North Carolina') give no inland

records for the state. The altitude here is about 4,000 feet.—J. J. MURRAY, *Lexington, Va.*

A Bird New to the West Indian Avifauna.—On July 31, 1935, at Glover's Island, an islet off the coast of Grenada, I obtained a female specimen of the Dusky-tailed Skimmer (*Rynchops nigra cinerascens* Spix). This South American bird has not previously been reported from the West Indies. The example collected was the only one of the kind seen. It was in the midst of a large nesting colony of Laughing Gulls (*Larus atricilla*) and Roseate Terns (*Sterna dougallii dougallii*).—STUART T. DANFORTH, *University of Puerto Rico, Mayagüez, Puerto Rico.*

Former Occurrence of Carolina Paroquet in New Jersey.—Mr. Harry P. Havell, a descendant of the family of the engraver of the plates of Audubon's 'Birds of America' has been kind enough to turn over to me a record which is the only report which I can find of the Paroquet (*Conuropsis carolinensis*) in New Jersey.

The late Albert Emmet Hedden (born in 1841—died in 1915) told Mr. Albert H. Hedden, his son and Mr. Alonzo B. Hedden, his nephew, of the occurrence of this species in East Orange, Essex Co., New Jersey when he was a boy. They placed the time between 1850 and 1860, and both recall exactly the same story.

The Paroquets occurred probably twice at least in hot weather (I suspect September) and were considered very destructive to the small household apple orchards, maintained by the family at that time. The birds occurred in flocks and tore the apple fruit apart, extracting the seeds.

It is interesting to note that although the Paroquet has been recorded in the past from Pennsylvania, from the Shore of Lake Ontario, and from the vicinity of Albany, New York, in winter, there are very few reports so far to the northeast. Due to the fact that this bird is thought to be extinct, it seems well to publish the record.—WARREN F. EATON, *63 Normal Avenue, Upper Montclair, N. J.*

A New Striped Owl from Tobago.—A specimen of *Rhinoptynx clamator* from the island of Tobago differs so markedly from numerous specimens from the nearby mainland of South America that it is believed to be a new race.

Rhinoptynx clamator oberi, subsp. nov.

Subspecific characters.—Nearest *Rhinoptynx c. clamator* but larger, wing 284 mm. long instead of 265 mm. or less; differing from this and the other two races of the species in having the dark bars on the outer webs of the primaries as broad or broader than the buffy to tawny interspaces instead of much narrower; each streak on the sides and flanks giving out a pair of thin, distinct, dusky bars instead of few or no mottlings.

Type.—Adult unsexed, U. S. Nat. Mus. No. 75,112, Tobago, August, 1878, collected by F. A. Ober.

Measurements of type.—Wing, 284; tail, 154; culmen, from cere, 22 mm.

Range.—Island of Tobago, off island of Trinidad, Venezuela.

Remarks.—Fourteen specimens of *Rhinoptynx clamator* from various parts of South America, including five from the adjacent mainland of Venezuela, have been examined. Neither these nor the specimens described and illustrated in the literature of the bird have the characters enumerated above.

No other specimen of this Owl has been collected on Tobago in so far as is known. It may have become extinct with the advent of man, as have three Owls on other islands.—ESTELLE H. KELSO, *Washington, D. C.*

Chuck-will's-widow in Illinois.—An adult female *Antrostomus carolinensis* was collected on April 17, 1935, near Alto Pass, Union County, in southwestern Illinois. Robert Ridgway (Catalogue of Birds Ascertained to Occur in Illinois, Ann. Lyc. Nat. Hist. N. Y., X., 376; A Revised Catalogue of Birds Ascertained to Occur in Illinois, Bull. Ill. State. Lab. Nat. Hist. No. 4, 185) in early days found it to be a rare summer resident in Illinois north to 38° 20′, i.e. in the southern fourth of the state. He, together with others, has heard it in the territory in question in comparatively recent years. Nevertheless, the writers have been unable to find a single definite mention of its being taken in the state; hence this record.—A. C. Twomey, *Camrose, Alberta, Canada,* and C. T. Black, *Chicago, Illinois.*

Arkansas Kingbird (Tyrannus verticalis) at Lake Mattamuskeet, N. C.—On October 1, 1935, two Kingbirds were seen perched on a telephone wire by the highway just outside the borders of Lake Mattamuskeet Migratory Waterfowl Refuge, in Hyde County, North Carolina. One of these birds was the well known eastern species, *Tyrannus tyrannus,* and the other an Arkansas Kingbird (*Tyrannus verticalis*). All of the chief markings of the western bird could be plainly seen with the naked eye as well as through 8-power glasses and a comparison of the two birds was easily had as they stayed rather close together, flying eventually to the tops of some trees nearby. As *verticalis* is an accidental visitor in the Eastern States and records in North Carolina are scarce or missing, it is thought worth while to publish this record.—Earle R. Greene, *U. S. Biological Survey, New Holland, N. C.*

Arkansas Kingbird (Tyrannus verticalis) in Wisconsin.—June 2, 1935, there were secured by Mr. E. G. Wright, of the Academy staff, in Kenosha Co., Wis., two specimens of the Arkansas Kingbird. Both sexes were represented, the male only being in breeding condition.

At least one other bird of this species has been taken in the Chicago region and there have been creditable sight records.—E. R. Ford, *Chicago Academy of Sciences, Chicago, Ill.*

Fargo's Thorn-bird in Matto Grosso.—In a recent paper on *Phacellodomus rufifrons fargoi* (Occ. Papers Mus. Zool. Univ. Mich., No. 316, 1935, p. 2) I listed two specimens from Descalvados and Urucum de Corumba, "Uruguay." Both these localities are, of course, in the state of Matto Grosso, Brazil, not in Uruguay as recorded. I am indebted to my friend Colin C. Sanborn of Field Museum for calling this lapse to my attention.—Pierce Brodkorb, *Museum of Zoology, Ann Arbor, Michigan.*

Rough-winged Swallow Breeding in Rhode Island.—The Rough-winged Swallow (*Stelgidopteryx ruficollis serripennis*) has been restricted very closely to the southwestern coastal section in Rhode Island. Mrs. Alice Hall Walter informs me that a nest located in a sewer pipe emptying into tide water was found at Pawtuxet on June 10, 1933.

The first known breeding record of this species in the valley of the Blackstone River, and the farthest north occurrence in the state, was established when the writer found a pair of birds about a nesting site near Lonsdale, in the town of Lincoln, on May 19, 1935. The bank in which the nest was located overlooks a small marsh on the west bank of the Blackstone River. I did not inspect the nest at this time, but a visit on May 21 showed that the nest was occupied. The entrance was too small to admit my hand, and I had neglected to bring a light. On the evening of May 23, I saw no signs of the birds as I approached and after climbing the bank, which was

rather soft and loose, I found one egg, with its contents still intact, on the ground beneath the entrance. Nearby were the remains of another. A search failed to show any signs of the occupants.

Visits immediately subsequent to this showed no sign of the birds, but early in June, I occasionally saw one of them nearby, never two. I was therefore completely surprised on June 21, after deciding to look at the nest again, to see the widely opened mouths of three young in the beam of my flashlight. They evidently connected every disturbance of their dark retreat with food. The entrance tunnel was about three feet long. But this second attempt to bring out a family was also a failure, for on June 27, the remains of one of the young birds, torn apart by some prowler, were near the entrance of the tunnel; the adults or other young were never seen again.

An interesting sidelight on this occurrence is the fact that the nesting site is less than two miles from the western border of Bristol County, Massachusetts, where attempts have been made to locate a nest of this species in recent years. (See Auk, January, 1934, p. 85.) Mr. A. C. Bent informs me that, so far as he knows, its nest has not been found through the season of 1935.—Alfred E. Eynon, *Lonsdale, R. I.*

A Colony of Cliff Swallows in Chester County, Pa.—In view of the scarcity of nesting Cliff Swallows (*Petrochelidon a. albifrons*) in southeastern Pennsylvania it seems desirable to publish the record of a colony. It is located on the farm of Mr. Warren Hughes, in the northern part of Chester County, about three miles from Elverson and about ten miles southwest of Pottstown. Mr. Hughes moved to this farm from Berks County in 1902 and the present large modern barn was built in 1912. The Swallows—a pair—arrived in 1913 or 1914 and built a nest over a nail left by the carpenters on the vertical side of a joist projecting out from the wall and forming the floor of the overhang; it is about nine feet from the ground. The following year two pairs arrived. Mr. Hughes noticed they had some difficulty in making the nest adhere to the joist and nailed a narrow strip along the lower part to furnish a support for the nests; after that they had no trouble. From that time until now the colony has been very slowly growing, though whether at a uniform rate is not definitely known. At the time of my visit on July 4, 1935, there were ten occupied nests and two incompleted nests under the overhang. With them were about an equal number of Barn Swallows, apparently living together in complete harmony. One Barn Swallow nest was only about twelve inches from a Cliff Swallow nest, both containing young. Last summer, (1934), one or two pairs of the Cliff Swallows moved up under the projecting eave, near the peak of the roof, on the same side of the barn, facing south. This summer five occupied nests were observed there; a strip had also been nailed to the rafter there to furnish a sure support for the nests. This makes fifteen occupied nests in all; there are at least fifteen pairs of the Swallows and perhaps two or three more. The nests contained the second brood at the time of my visit and a number of the young of the first brood were on the wing and seen resting on shed roof and telephone wires, mingling sociably with the Barn Swallows. It was learned from Mr. Hughes that the Cliff Swallows arrive in the Spring a week to two weeks after the Barn Swallows and leave about that much later, at the end of the season. The exact dates, unfortunately, are not available. This year, (1935) they were very late and he began to fear they would not come; finally, however, they arrived, eighteen to twenty days after the Barn Swallows.

This summer I ascertained that the Swallows have appeared and nested on three or four farms—a pair in each case—in the neighborhood, and not over a mile from

the Hughes farm in any instance. This may be the beginning of new colonies whose future growth will be watched with interest.

The only other colony of Cliff Swallows, so far as I know, in this part of the country is one just over the line in Berks County. This group is about seven or eight miles in an air line from the one described. It is reported that the Berks County colony was not as strong this summer as the one visited. Mr. Hughes is very proud of his colony and protects the birds carefully.—HORACE D. MCCANN, *Paoli, Pa.*

Fish Crow Taken near Harrisonburg, Virginia.—On May 10, 1935, a Crow shot one mile west of Harrisonburg, Va. was sent to Dr. Harry C. Oberholser of the U. S. Biological Survey and identified as the Fish Crow (*Corvus ossifragus*). Dr. J. J. Murray of Lexington, Va., has seen and heard this species about Lexington since 1928 (Auk, July 1934, p. 381), but reports that this is the first actual specimen taken in the Shenandoah Valley or anywhere inland in Virginia, except in the Washington, D. C., region.—D. RALPH HOSTETTER, *Harrisonburg, Va.*

The Bush-tit of the Southern Great Basin.—In the course of my field work in the Charleston and Virgin Mountains of extreme southern Nevada in 1931, 1932 and 1933, three Bush-tits were collected as a routine matter and with no suspicion at the time that they were other than *Psaltriparus minimus plumbeus*. Later on, when making the necessary critical comparisons for a report on the region, it was at once obvious that these birds were not *plumbeus*, at least as that form occurs in the mountains of southeastern Arizona.

Briefly, the differences are that eastern Arizona *plumbeus* possesses a more or less olivaceous back, contrasted with an ashy gray head. The Nevada specimens are clear ashy gray over the whole upperparts, which are concolor with the pileum or very nearly so. In addition, the Nevada birds are slightly paler below and lack a pinkish or brownish tinge which, in fresh plumage, is almost invariably to be seen in *plumbeus*.

In the fall of 1933 the three Nevada specimens were compared with the type and type series of *Psaltriparus minimus cecaumenorum* described from Central Sonora by Thayer and Bangs (Proc. Biol. Soc. Wash., 19, No. 4, Feb. 26, 1906, p. 20). The resemblance was exceedingly close, so very close indeed that had more than three Nevada specimens been available I would unhesitatingly have listed them as of the same race. In April of the present year Mr. Laurence Huey and the writer spent a week in the Providence Mountains in southeastern California, one of the principal objects of the trip being the collection of a series of Bush-tits. Five specimens, all adults, were taken, and four of the type series of *cecaumenorum* were subsequently borrowed from the Museum of Comparative Zoölogy for a re-examination.

As a result of these studies the range of *Psaltriparus minimus cecaumenorum* must be extended northwest to southern Nevada and southeastern California. The three southern Nevada and the five Providence Mountains specimens are most extreme in characters; those from Owens Valley (5), the White Mountains of California (21) and Mt. Magruder, Nevada (8), are varyingly intermediate toward *plumbeus*, though apparently closer, in series, to *cecaumenorum*. Dr. Oberholser informs me that specimens in the collection of the Bureau of Biological Survey from the Panamint Mountains and the New York Mountains, California, belong unquestionably in the same category with the southern Nevada and Providence Mountain birds.

Incidentally, I have been urged to provide the southern Great Basin Bush-tit population with a new name because, in the available series, the Sonora birds are not quite so ashy gray above and are slightly paler below. However, when allowance is made for the post-mortem color change which may have taken place in the thirty

years which have elapsed since the type series of *cecaumenorum* was collected, and also for the fact that the series is, in part, composed of juveniles (though listed as "adult" in the original description), I believe the differences far too intangible to recognize by name. It is entirely possible that a more adequate series of *cecaumenorum* will make the naming of the Great Basin birds desirable.

In conclusion I wish to thank Dr. Oberholser for critical notes on the type specimens of Baird's *plumbeus* and Ridgway's *santaritae*, both of which are, as one might assume on geographic grounds, definitely olive-gray dorsally.—A. J. Van Rossem, *San Diego Society of Natural History, San Diego, California.*

The Ohio House Wren in Maryland.—On October 27, 1935, I collected an immature female Ohio House Wren (*Troglodytes aëdon baldwini* Oberholser) at Cornfield Harbor, Maryland, near the mouth of the Potomac River. This bird, in full fall plumage, is typical of this recently described race in the distinctly gray tone of both upper and under surfaces. While Dr. Oberholser in his statement of specimens examined[1] included both the District of Columbia and Virginia the present is the first definite record for Maryland, where the race in question should come during migration.—Alexander Wetmore, *U. S. National Museum, Washington, D. C.*

Short-billed Marsh Wren (Cistothorus stellaris) Nesting in September.—On September 12, 1935, I located seven young Short-billed Marsh Wrens just out of the nest in the Convis Twp. Calhoun Co. marsh fifteen miles east of Battle Creek, Michigan. The young were unable to fly and five of them were easily captured. One of these was kept for a specimen and weighed 7.5 grams.—Lawrence H. Walkinshaw, *Battle Creek, Michigan.*

Breeding Behavior of Bluebirds.—On the morning of March 27, 1935, I first noticed that a pair of Eastern Bluebirds (*Sialia s. sialis*) were paying marked attention to a last year's Downy Woodpecker hole located in a willow tree back of my home in Middleton, Mass. For several days thereafter I observed the pair either in the vicinity of the tree or on the tree itself. It was apparent to me that this was their chosen nesting site. I gave these birds but passing notice, however, as it was a common occurrence for a pair to nest in the vicinity, although usually they had selected a bird house especially provided in a neighboring tree. In fact, it was not until April 8, when I saw the female having difficulty in trying to alight on a nearby telephone wire, that my interest was aroused in their behavior. Securing my binoculars, I readily determined the right leg of the female to be crippled in such a fashion as to give the bird no control over it whatsoever. The tarsus and toes, while of normal appearance, seemed stiff and lifeless and were held in a forward position. The slight breeze that happened to be blowing at the time was of sufficient velocity to continually upset the bird's balance by swaying the wire. The creature continually fluttered its wings in an attempt to right itself.

In spite of this severe handicap, I noted, during the days that followed, that the female Bluebird participated in the usual preliminary nesting routine. It was able to force itself through the small Woodpecker hole, even to bring in such nesting materials as dead grass blades and feathers. Once, while peering out from its nesting hole, the male passed it bits of nesting material. On another occasion I noticed the pair copulating.

Early on the cold, rainy morning of April 13 the harmonious relationship of the

[1] Ohio Journ. Sci., vol. XXXIV, March, 1934, pp. 90–93.

pair was interrupted by the appearance of another female Bluebird in the vicinity of the nest. I did not see the stranger arrive but found it fighting furiously with the crippled female. Both birds were darting at one another and striking with their bills. Sometimes they clashed in mid-air, sometimes on the willow branches. I did not have to watch them long to realize that the crippled female was on the defensive and suffering as a result of the onslaught. Finally, after five minutes of such warfare, the belligerents suddenly grappled with their bills and feet and fell somewhat heavily into the wet grass where they continued in an even more desperate struggle. When I approached to within three feet, their attention was so occupied that they did not notice me. I saw that the crown of the crippled bird was featherless and bleeding and was being persistently pecked by the opponent. As I bent over the birds the marauding female discovered me. Frightened, it attempted to escape from the other which was blindly though viciously gripping its under plumage and thus holding it down. Eventually I started to pick up the two birds but as soon as I touched both of them they separated hurriedly and flew away in opposite directions. During the entire contest, the male Bluebird, until I approached the females, was perched on the top of the willow tree and seemed absolutely indifferent to the struggle. Afterwards it remained on a nearby telephone wire apparently possessed of the same attitude.

The next day I saw a pair of Bluebirds still at the nesting hole. But my binoculars revealed that the legs of the female were perfectly normal. In the ensuing weeks the pair successfully reared their young in the Woodpecker hole. Thus all evidence seemed to indicate that the crippled female, while normal as far as its nesting abilities were concerned, was unable to overcome its physical handicap in defending itself against an aggressive, wandering, normal female desirous of securing either a nesting site or mate or both.—Olin Sewall Pettingill, Jr., *Middleton, Mass.*

Notes on the Relation of the European Starling to Other Species of Birds.—Due to its quarrelsome habits and preference for nesting in holes and cavities the European Starling (*Sturnus v. vulgaris*) often comes into direct conflict with some of our native species of birds, particularly during the breeding season. On account of its omnivorous food habits the Starling may also indirectly affect the welfare of other birds.

Several interesting observations were made by the writer on the Starling's relations with other birds while he was engaged in a study of the distribution, habits, and economic status of the European Starling in Canada during the period 1932–35. Additional notes on this subject have been collected by the writer through personal correspondence and from important publications, particularly that of Kalmbach, 'The European Starling in the United States.'

Mr. M. Robinson, Algonquin Park, Ontario, reports Starlings having evicted two pairs of Arctic Three-toed Woodpeckers which had nested in his vicinity for five years. The Woodpeckers returned the next year, but were driven away again.

Wm. H. Moore, of Scotch Lake, New Brunswick, writes, "Some people covered their Martin houses with sacking to keep the Starlings out until the other birds were ready for nesting and in passing through Centreville County, several Starlings were observed sitting in trees adjacent to the blanketed Martin houses."

Wallace Havelock Robb, Kingston, Ontario, reports Starlings as plucking out the eyes of adult Robins with which they were feeding.

In June 1934 a Bluebird's nest was located by the writer in a telephone pole. The female bird was found dead on the nest, her head badly pecked and with all the eggs broken. The male bird was still in the vicinity. From this same cavity a Star-

ling's nest had been taken two years previously. It seems probable that Starlings may have killed this bird in an effort to appropriate the nesting site for themselves.

It has been reported to the writer that, in the spring of 1933, Starlings were seen destroying the hanging nest of a Baltimore Oriole near St. Thomas, Ontario. Several writers have cited similar examples of Starlings destroying the eggs and young or appropriating the nests of other species of birds such as Martins, House Wrens, Robins, English Sparrows and Domestic Pigeons.[1] Kalmbach when dealing with this question writes, "These instances, of course, picture the Starling at its worst . . . . In the case of the Starling, many of the nest despoiling activities occur in the dooryard, where they are almost certain to come under human observation."

Due to its omnivorous habits the Starling consumes much wild fruit in winter (unpublished data) and consequently it is decreasing the amount of food formerly available to birds migrating north in the spring as well as those native species which spend the winter in the north. The Starling is a voracious feeder on ground insects (writer's unpublished data) and in this respect may compete with the Robin; the Meadowlark and other species. However, it is doubtful if much weight can be placed upon this point, since Starlings, in general, feed in rather small groups during the spring and summer and since there is generally an abundance of insect life. Again, Kalmbach[2] indicates that after considering the relative worth of the species concerned, the Starling's taking of other bird's food is not at all alarming. He writes, "After carefully weighing all the evidence available, it is safe to state that, in the Northeastern States, the Starling is economically the superior of the Robin, the Catbird, the Red-winged Blackbird, the Grackle, the Cowbird or the English Sparrow. This leaves the Meadowlark as the only highly desirable species materially affected by this competition for food."

It would appear that in view of the Starling's questionable relations with other birds the future of some native species of birds may be threatened. However, these birds, such as the Bluebird and Flicker will possibly find safe nesting places in most localities farther away from the abode of man, in whose vicinity the Starling seems determined to be. Musselman[2] reports that he has had marked success with Bluebirds occupying nesting boxes which he has set up on posts over a five mile stretch. Since the Bluebird is a smaller bird the Starling could not enter these houses, due to the small entrance hole.

It may be noted that no appreciable decrease in the numbers of Bluebirds and Flickers has been evident during the past few years, even in those areas where the Starlings are abundant. The Starling's unfriendly relations with other birds may often warrant condemnation. However, the writer is of the opinion that the effect of these habits may often be more apparent than real. We have numerous instances at hand concerning similar questionable relations on the part of other species of birds. Much study of this problem is necessary before we can pass judgement on these activities of the Starling.—M. S. Ferguson, *University of Illinois, Urbana, Illinois.*

Worm-eating Warbler in Maine.—On September 1, 5 and 12, 1935, a single Worm-eating Warbler (*Helmitheros vermivorus*) was seen in a flock of migrant Warblers on Hog Island, in Wood Pond near Jackman, Somerset Co., Maine. It was not seen previous to this although we had been observing birds on the island all summer. I have been familiar with this species for many years at Ridgefield, Conn., and in

[1] Kalmbach, E. R. 1928. The European Starling in the United States. Farm. Bull, 1571: 1–27, 8 fig.

[2] Musselman, T. W. 1934. Help the Bluebirds. Bird Lore. 36: 9–13.

Westchester Co. and vicinity, New York. The present individual was well seen on each occasion and its characteristic actions noted. The black and buff striped crown, plain greenish upperparts and plain underparts were seen at close range, and the bird was present long enough for others to be called to view it.

A feature of interest in this occurrence is the date, as I have never seen it as late as this even where it is fairly common in summer.—Alma Forster, *945 West End Ave., New York City.*

The Blue-winged Warbler in New Hampshire.—On July 26, 1935, while searching for woodland birds in St. Anselm's College Bird Sanctuary at Manchester, N. H., I noticed among some deciduous trees bordering a white pine woods a Warbler, the field marks of which were unmistakable. Two large white wingbars caught the eye at once; bright yellow underparts with white on the ventral surface of the tail were easily seen; finally, a yellowish head with a conspicuous narrow black line through the eye left no doubt as to the identity of the bird—a Blue-winged Warbler (*Vermivora pinus*). The bird was in company of several Blue-headed Vireos and Black-capped Chickadees.

Mr. George C. Atwell, Secretary of the New Hampshire Audubon Society, informs me that this Warbler has not previously been reported from New Hampshire.

The occurrence of the bird in the southern part of New Hampshire is not unexpected since Forbush states that there are many summer records of the bird in eastern Massachusetts.—Eugene J. Goellner, *St. Anselm's College Ornithological Society, Manchester, N. H.*

Palm Warbler in the Northern Panhandle of West Virginia. A Correction.—In my list of the 'Birds of the [Northern] West Virginia Panhandle' (Cardinal, Vol. III, No. 5, January, 1933, p. 119), I name the Yellow Palm Warbler (*Dendroica palmarum hypochrysea*) basing my inclusion of the form on the sight record of Mr. A. B. Brooks and two fellow observers of a Palm Warbler seen and heard at Oglebay Park, near Wheeling, Ohio County, West Virginia on May 10, 1919. My calling this 'presumably, though not certainly' a Yellow Palm Warbler was, I believe, a mistake, although Mr. Brooks may have told me that the bird was strongly yellow below. At any rate, on September 14, 1935, on the Adrian Jones farm, about two miles south of Bethany, Brooke County, and not far from Castleman's Run, I took an immature male Palm Warbler which was certainly *not* strongly yellow below, and therefore of the western subspecies, *Dendroica palmarum palmarum.* To the best of my knowledge this is the first specimen of this subspecies to be taken in the northern Panhandle.—George Miksch Sutton, *Cornell University, Ithaca, New York.*

Late Nesting of Myrtle and Black-throated Green Warblers in Pelham, Massachusetts.—On July 24, 1935, I watched a female *Dendroica coronata* collecting nesting material, but unfortunately did not find the nest. My latest date in previous years was a nest with newly hatched young on July 25, 1927, the young birds leaving the nest on August 3.

As to *Dendroica v. virens* my latest dates for young out of the nest being fed by parents were August 21, 1931, and August 23, 1928. It was, therefore, most surprising to me on September 7 to see a molting female of this species feeding two fully grown young in first winter plumage.—Margaret M. Nice, *Pelham, Massachusetts.*

A West Indian Record for the Bay-breasted Warbler.—On May 5, 1935, Mr. Harry C. Beatty collected a male Bay-breasted Warbler (*Dendroica castanea*) at

Fairplain Pastureland, St. Croix, U. S. Virgin Islands. This specimen, in full adult plumage, was kindly presented to me by Mr. Beatty, and is now No. 1505 in my collection. To my knowledge this is the first West Indian record of this species.—STUART T. DANFORTH, *University of Puerto Rico, Mayagüez, Puerto Rico.*

The Yellow Palm Warbler Taken near Toledo, Ohio.—On October 20, 1935, in Monclova Township, Lucas County, Ohio, I collected a female Yellow Palm Warbler (*Dendroica palmarum hypochrysea*).

From the softness of the skull, I judged it to be a bird of the year. When found, it was not accompanied by any other Warblers and no other Palm Warblers were seen during the day. My identification was checked by Dr. J. Van Tyne and Milton B. Trautman, both of the University of Michigan. The skin will be deposited in the Ohio State Museum.

The only other published record of an Ohio specimen appears in 'The Auk' Vol. IX, p. 397, 1892. This bird was taken on April 10, 1891, by G. D. Wilder near Oberlin, Ohio.—LOUIS W. CAMPBELL, *Toledo, Ohio.*

Connecticut Warbler in the Northern West Virginia Panhandle.—On September 16, 1935, on the Berne Gibson farm, somewhat more than a mile east of the village of Bethany, Brooke County, West Virginia, and not far from the southern bank of Buffalo Creek, I took an adult male Connecticut Warbler (*Oporornis agilis*), the first specimen of this species I have succeeded in collecting in West Virginia. A few days previously I had seen another Connecticut Warbler, apparently also an adult male, but failed to collect it. It is my belief that this retiring species is commoner during the period of migration in many parts of West Virginia than the published records would lead us to suppose.—GEORGE MIKSCH SUTTON, *Cornell University, Ithaca, New York.*

Scarlet Tanager in St. Lucia.—It seems desirable to call attention to the capture of two specimens of the Scarlet Tanager (*Piranga erythromelas*) in St. Lucia by Mr. Stanley John of Castries, St. Lucia. These were a female on May 9, 1935, and a male on May 19, 1935, both in breeding plumage, and both at the same spot, at Forestiere on Piton Flore. It has been my privilege to examine both of these specimens, which are in the possession of Mr. John. He recorded observing these specimens (but for sufficient reason made no mention of their actual capture) in an anonymous item entitled "New Bird Record for St. Lucia," on page 11 of a local paper entitled 'The West Indian Crusader,' weekly edition, for May 25, 1935. This brings the list of birds definitely known to occur in St. Lucia up to 79.—STUART T. DANFORTH, *University of Puerto Rico, Mayaguez, Puerto Rico.*

Late Nesting of the Goldfinch at Baltimore, Md.—On September 1, 1935, I found a nest of the American Goldfinch (*Spinus tristis tristis*) containing four slightly incubated eggs. It was located among weeds, four feet from the ground, in a field bordering Lake Roland, Baltimore, a week later there were only three eggs and on September 15, a newly hatched bird had appeared the two remaining eggs being apparently ready to hatch. During the following week disaster overtook the birds as the nest was empty on the 22d.

While I have found many Goldfinch nests in various stages of development in August this is my first September record.—BROOKE MEANLEY, *5111 Roland Ave., Baltimore, Md.*

Blue Grosbeak in the Northern Panhandle of West Virginia.—On the afternoon of August 28, 1935, Mr. Karl Haller and I saw an adult male Blue Grosbeak

(*Guiraca c. caerulea*), about three miles northeast of the village of Bethany, Brooke County, West Virginia, a short distance from the Pennsylvania state line. The bird flew across a narrow valley from a thicket of locust trees in response to our squeaking; perched for an instant only a short distance from us; flew to a higher tree close by, giving us ample opportunity to note its large size, its heavy beak, its dull blue coloration, and the bright chestnut of its wing-coverts; and disappeared. We searched for hours that afternoon and on the following two days, but did not see the bird again.

I have recorded the Blue Grosbeak but once previously in West Virginia, a female observed in our garden at Bethany, on July 6, 1929 (Birds of the West Virginia Panhandle, *Cardinal*, Vol. III, No. 5, January, 1933, 121). GEORGE MIKSCH SUTTON, *Cornell University, Ithaca, N. Y.*

White-winged Crossbill on Baffin Island.—In Mr. J. Dewey Soper's admirable 'Faunal Investigation of Southern Baffin Island'[1] no mention is made of the White-winged Crossbill (*Loxia leucoptera*), in the list of bird species. I take pleasure, therefore, in reporting that my friend Mr. John T. Ford, of the Hudson's Bay Company, and at present at Port Burwell, Labrador, secured a White-winged Crossbill specimen "in the Spring" of 1933 at Lake Harbour, Baffin Island, during "three days of stormy weather." Unfortunately I have not been able to ascertain the exact date of the capture; nor am I certain that any part of the specimen is still in existence; but there can be no doubt concerning the identification of this bird with "bill crossed" and with "white bars on its wings" concerning which Mr. Ford wrote me in a personal letter dated Cartwright, Labrador, January, 1934, and in a subsequent letter (just received) dated Port Burwell, Labrador, July 23, 1935.—GEORGE MIKSCH SUTTON, *Curator of Birds, Cornell University, Ithaca, New York.*

Eastern Henslow's Sparrow and Lincoln's Sparrow in West Virginia.—For many years it has been a matter of interest to West Virginia ornithologists that Eastern Henslow's Sparrow (*Passerherbulus henslowi susurans*) has so long escaped notice in the state. Special efforts have been made to locate this species, both in breeding season and in migration.

On October 9, 1935, we were observing birds near Masontown, Preston County, West Virginia, when we noticed a very elusive Sparrow flushing close to us as we went through a brushy field. The bird was collected, and proved to be a female Henslow's Sparrow, the first one recorded, so far as we are aware, from the state. A skin was made of it, and it has been deposited in the museum of West Virginia University.

While collecting along Lake Terra Alta, Preston County, West Virginia, on October 12, 1935, the same group saw a number of Lincoln's Sparrows (*Melospiza lincolni lincolni*), and one was collected. It also was placed in the West Virginia University Museum. There are a few previous sight records for this bird in West Virginia, but evidence would lead to its being considered very rare in the state.

Observation in the neighborhood of Masontown has suggested that Henslow's Sparrows have occurred there in numbers during the migration season, at least a dozen having been seen on October 9. We are expecting to check the territory very carefully for possible breeding birds next season.—KARL HALLER, JAMES HANDLAN, ABE MARGOLIN, MAURICE BROOKS, *Dept. of Biology, West Virginia University, Morgantown, W. Va.*

[1] Soper, J. Dewey. A Faunal Investigation of Southern Baffin Island. Bulletin No. 53, Biological Series No. 15, Canadian National Museum, Canada Department of Mines, 1928, 129 pp.

Junco hyemalis connectens Taken near Toledo, Ohio.—On March 31, 1935, I collected a male *Junco hyemalis connectens* from a small group of *J. hyemalis* in Jerusalem Township, Lucas County, Ohio.

The identification was made by Dr. Alden H. Miller, Museum of Vertebrate Zoology, Berkeley, California. The skin will be deposited in the Ohio State Museum.

I wish to express my thanks to Dr. Miller and also to Dr. J. Van Tyne, Curator of Birds, Museum of Zoology, University of Michigan, for their kindness in identifying this bird.—Louis W. Campbell, *Toledo, Ohio.*

Spizella breweri taverneri in Texas.—While studying and collecting birds in the vicinity of Alpine, Brewster County, Texas, during February and March, 1935, I occasionally made short excursions north into Jeff Davis County, usually to visit the brushy bottom of Musquiz Canyon (alt.—4,500 ft.) where the Fort Davis road crosses it ten miles northwest of Alpine. There I sometimes found wintering Sparrow flocks composed of Gamble's, Brewer's, and Desert Sparrows, together with a few Vesper and Savannah Sparrows. They were rather shy and kept moving so actively that it was difficult to pick out and identify individuals. In determining the composition of the flocks I collected several Brewer's Sparrows, and on March 9 took a male which was obviously different and suggested the Timberline Sparrow, of which I had never seen specimens. Dr. Joseph Grinnell has since examined the skin at the Museum of Vertebrate Zoology and reports that it is indeed a thoroughly typical specimen of *Spizella breweri taverneri* Swarth and Brooks.

This is the first Texas record of the Timberline Sparrow. The first United States record for this subspecies was that of a specimen collected by Seth Benson in Otero County, New Mexico, on October 13, 1931, and recorded (Condor, *34*, 1932, p. 231) by Dr. Grinnell. These two records would seem to indicate the region of the upper Rio Grande as the hitherto unknown winter range of the Timberline Sparrow.—Josselyn Van Tyne, *University of Michigan Museum of Zoology, Ann Arbor, Michigan.*

Harris's Sparrow in Massachusetts.—Knowing the reluctance of many ornithologists to accept sight records of rare birds, the following observations are offered for what they may be worth.

About 7.00 a.m., April 29, 1935, I noticed a bird, with considerable black about the face, in some shrubbery about twenty-five feet from my window. Going for my binoculars, I found on returning that the bird had flown to a feeding tray, not over fifteen feet away, and I had, in plain view, what I considered to be, a male Harris's Sparrow (*Zonotrichia querula*) in spring plumage. It was watched for a few minutes until the arrival of other birds at the tray caused it to return to the shrubbery. Having no means at hand to collect the specimen, it seemed desirable to establish its identity, with all possible accuracy, by some other means.

So I went to my collection and, from my series of Harris's Sparrow, selected three skins that seemed to match quite closely the bird I had just been looking at. With these three skins I went back to the window and found the Sparrow had returned to the tray. At such short range it was a simple matter to check every detail of his plumage even without the binoculars. I considered the specimen to be a bird of the previous year in his first nuptial plumage. The black of the center and forward part of the crown was unbroken but lighter edgings were clearly visible on the hind head. The chin and upper throat were solid black but the color was either undeveloped on the lower throat or was entirely obscured by a heavy veiling. Details of color and markings of the sides of the head, back, and wings were checked with the specimens in hand and they tallied in all particulars.

In size and movements the bird seemed much like a White-throated Sparrow. He did not appear larger, which I should have expected, nor did he show any of the individuality that the White-crowns possess. Had it not been for his black markings and pinkish bill it would have been very easy to overlook him in the shrubbery. He was not shy or nervous in his movements but would not associate with other birds at the food tray and always retreated to the shrubbery when another bird arrived.

After watching him for about twenty minutes I had to leave for the day, but he was seen by members of my family until about 10.00 a.m. and was heard to sing a little. I did not expect to see him again, but on May 1 he made a brief visit to the food early in the morning and on May 6 just at dusk. He was not seen again.

At the time I did not know of another Massachusetts record but Mr. Ludlow Griscom has called my attention to a bird in the collection of the Boston Society of Natural History taken by Dr. John B. May and referred to in the appendix of Mr. Forbush's third volume of the 'Birds of Massachusetts and other New England States.' This bird is also recorded in 'The Auk' for 1929, p. 392, I believe. The bird seen by me would appear to be the second recorded instance of the occurrence of the species in this state.—F. Seymour Hersey, *Easton, Massachusetts.*

The Mississippi Song Sparrow in Virginia.—Consideration of the subspecific status of the Song Sparrows of southwestern Virginia during recent observations in that area led to the collecting on September 26, 1935, of several specimens near Pulaski and Marion. Comparison of these indicates that they are the Mississippi Song Sparrow (*Melospiza melodia beata*), being the first report of this race for the state. Skins were obtained at points nine miles southwest and three miles northeast of Pulaski, and three miles southeast of Marion, these places being in the Ohio River drainage. All were in process of completing the annual molt and are therefore believed to represent birds nesting in the area in question, not migrants. They agree in darker, less brightly rufescent coloration with specimens of the interior form of similar season from Tennessee, Ohio, Indiana, and Illinois.

Further material taken in the breeding season to determine the extent of range of the interior form in the state will be awaited with interest.—Alexander Wetmore and J. J. Murray, *U. S. National Museum, Washington, D. C., and Lexington, Va.*

The Snow Bunting in Virginia.—On February 9, 1935, while I was parked beside the road near McGaheysville, Va., watching a large flock of Crows go over, a lone Snow Bunting (*Plectrophenax n. nivalis*) appeared, flying low, and passed directly over my head as I stood beside my car. During the winter spent in the Blue Ridge Mts., I had not observed the species on any of the open balds in the mountains, while the point at which this observation was made was in the lowland between the proposed Shenandoah National Park and the Massanutten Range.—Charles J. Spiker, *Branchport, N. Y.*

Notes from Prince Edward Island.—*Otocoris alpestris* subsp. Horned Lark.—Inasmuch as MacSwain in his list of the birds of Prince Edward Island mentions the Horned Lark as a migrant only it may be of interest to record that on the evening of June 24, 1935, at Alberton, I saw and heard an individual flight-singing on the outskirts of the town. It later alighted in a potato patch and I approached to within five yards of it and studied it with field glasses. Three singing birds were seen at the same locality on June 25 and three on the road to Cape Kildare on June 26.

Sturnus v. vulgaris. European Starling.—I saw a flock of four fly to a barn in the town on June 29, 1935. I have had some experience with the species at Memram-

cook, N. B. and am quite sure of the identification.—Reid McManus, Jr., *Memramcook, New Brusnwick, Canada.*

Notes from Cheshire County, New Hampshire.—*Coccyzus a. americanus.* Yellow-billed Cuckoo.—On June 25, 1935, a female was found dead in a school yard in Winchester. It was in perfect condition and is mounted and preserved by Mr. Luman R. Nelson in his museum collection.

Sphyrapicus v. varius. Yellow-bellied Sapsucker.—I have recorded (Auk, 1934, p. 523) the breeding of this species here in 1934. This year another brood has been watched at the same place, were first noticed on August 3, and they feed on ants at the identical elm tree where the birds fed last year. This constitutes my second authentic county record west of Mount Monadnock.

Iridoprocne bicolor. Tree Swallow.—This spring a second singing male greeted the dawns with a song, slightly lower pitched than the singing bird recorded in 'The Auk,' 1934, pp. 380–381.

Hirundo erythrogaster. Barn Swallow.—From a group of more than one hundred young Swallows reared about a mile from my home, one bird was a complete albino; for nearly two weeks as the birds were amassing for flock migration, this albino was seen there.

Petrochelidon l. lunifrons. Cliff Swallow.—This year has shown a noticeable increase in this species, when for the past ten years it has been slowly decreasing as a breeding bird. Three known colonies, besides some scattered pairs, have been started. The largest colony contains thirty-three nests, and these are built on the north, east and south sides of a high barn.

Mimus p. polyglottos. Mockingbird.—From June 12 to 15, 1935, apparently a male, was about Mr. Nelson's home at Winchester, and was heard in song. It was seen several days later by summer residents around the cottages at Forrest Lake, in that town. The nearest breeding Mockingbirds known to me, are a pair at the Pratt home at Brattleboro, Vermont, where they have nested for some few years.

Turdus m. migratorius. Robin.—A female of this species has reared three broods this season at a new site each time about our house. She is a partial albino, all of the wings being white save for an inch and a half at both base and tip.

Dendroica p. palmarum. Western Palm Warbler.—On May 8, 1935, an individual was watched at close range for twenty minutes. This is my third spring record of the past five years.

Zonotrichia albicollis. White-throated Sparrow.—On February 3, 1935, I banded a wintering bird, my third successive winter record. Its plumage was dark, dirty-appearing, and the white throat was not a clear white. I have since heard that an individual wintered in 1934 at the Bosworth farm, a mile distant to the west.

Melospiza m. melodia. Song Sparrow.—This species is habitually absent in this locality by late October, although I have a few records in early November. My latest fall date is of a bird that was trapped on November 25, 1934, banded and released, and which repeated at the same trap the following day. This date is nineteen days later than any previous record I have.—Lewis O. Shelley, *East Westmoreland, N. H.*

Two Unusual Species Observed on the Susquehanna River at Harrisburg, Pa.—On November 17, 1935, while observing a flock of water fowl made up of two Canada Geese, eighteen Mallards, twenty Black Ducks, three Green-winged Teal, ten Ring-necked Ducks, two Lesser Scaup, three American Golden-eyes, one Ruddy Duck, two Hooded Mergansers. I noted three Loons which came to rest on the

water and drifted with the current toward the municipal beach on Independence Island. Two of the Loons were smaller and lighter than the third. One of the smaller birds swam within ninety feet of the island making possible its identification as a Red-throated Loon (*Gavia stellata*) in winter plumage. A good comparison could be made between this bird and a Common Loon (*G. i. immer*) which was a little farther off-shore. The birds were observed through 8× binoculars.

On November 18, 1935, three Snow Geese (*Chen hyperborea* probably *atlantica*) were observed by the writer on the Susquehanna at Harrisburg. When first seen about noon the birds were about two hundred feet off-shore. They were observed with 8× binoculars, the pink bill and black primaries were noted. Later in the afternoon four Snow Geese were seen by the writer and Dr. Harold B. Wood resting on one of the grass covered islands in the middle of the river. Probably the same three birds mentioned above joined a fourth.—Richard M. May, *2233 North Second Street, Harrisburg, Pa.*

Notes from Brigantine Beach, N. J.—*Limosa fedoa.* Marbled Godwit.—On September 1, 1935, I found a single individual feeding in shallow back water at the lower end of the island.

Hydroprogne caspia imperator. Caspian Tern. *Thalasseus maximus maximus.* Royal Tern.—On September 15, 1935, at the lower end of the beach I found two Caspian Terns and a Royal Tern resting on the sand. They were almost touching one another and could be compared to advantage. The Royal was distinctly smaller with more white on top of the head, the more slender bill, which was orange color in contrast to the strong red of the Caspian. There was an apparent difference too in the legs, those of the Caspian being longer and black while the Royal's seemed to be greenish yellow or brownish. In flight the Royal was more graceful or "Tern-like" with darker wing-mantle and less black at the tips.

A quarter of a mile away four more Caspian Terns were resting with a lot of Gulls.

Fregata magnificens. Man-o-war-Bird.—On September 15, 1935, a single individual came in over the lower beach soaring in 300-ft. circles at 150–200 feet altitude and gradually drifted off to the south. It was apparently very black with a sharply defined, very white, breast. It had a wonderful long tail deeply forked which it opened and closed, continually. In the ten minutes that it was in sight it made only three quick successive flaps of the wings, drawing them in close to the body and arching them deeply. As soon as it appeared all of the Gulls on the beach mounted to about the same height but were not seen to go near it.—Joseph W. Tatum, *Haddonfield, N. J.*

Four Rare Nesting Records for Maryland.—*Casmerodius albus egretta.* American Egret.—On April 12, 1931, Mr. Arthur H. Hardisty and I while collecting in Charles County, Maryland, secured a fine adult male bird of this species from a fisherman who had shot it earlier in the day. I asked him when and where he secured this bird and he told me in a "squawk" (Black-crowned Night Heron) colony half a mile distant. Having known this Heron colony for many years we went directly to it and found three occupied nests of the American Egret. Other birds of this species were present and seven were flying directly over us the entire time we were in the heronry. This small colony has been kept under observation since and has increased each year. The nests are of the usual type, made of sticks and lined with small scrub pine twigs (*Pinus virginianus*). Mr. Frank C. Kirkwood does not mention the American Egret nesting in Maryland in his 'List of the Birds of Maryland' published in 1895, and so far as I am aware this is the first breeding record for the state.

Podilymbus podiceps podiceps. PIED-BILLED GREBE.—On several occasions I have seen young of this Grebe unable to fly in the marshes near Point Lookout, Piney Point, and St. Clair Lake in St. Mary's County, Maryland. On June 3, 1932, in company with Mr. Robert McDermott, I found a nest with five fresh eggs in Broadwater Marsh, Anne Arundel County, Maryland. I came on the bird suddenly before she had time to cover her eggs, and both birds came very close to our boat. The nest was placed on a pile of drift in one of the large channels where the water was about three feet deep. It was composed mostly of leaves and stems of water lilies and other drifted aquatic vegetation. Three of the eggs were entirely fresh and the other two showed a slight trace of incubation. Kirkwood supposed that this species nested in Maryland, but there seem to be no records of any one having collected eggs previously.

Iridoprocne bicolor. TREE SWALLOW.—For many years I have believed that this Swallow nested in St. Mary's County in southern Maryland, but it was not until May 30, 1933, that I actually found a nest with five fresh eggs. The birds had located in an old Flicker's hole about 15 feet up in a dead pine stub. The nest was composed of dried straw and grass intermixed with feathers and lined with white chicken feathers. My friend Mr. Paul Hodge, tells me that he has taken two sets of the Tree Swallow at Fair Haven, Anne Arundel County, Maryland. Both nests were in natural cavities in old apple trees, and the birds were seen in each case. Kirkwood states that this species nests in the upper part of Maryland and on the eastern shore along the Chesapeake Bay. As a matter of interest the eggs of the Tree Swallow can be readily distinguished from those of the Bank Swallow by being shiny white with a distinct gloss, while the latter have a dull finish.

Sterna dougalli dougalli. ROSEATE TERN.—On June 10, 1933, Mr. McDermott and I collected in Worchester County, on the outer sand bar extending from Ocean City along Chincoteague Bay. When about five miles south of Ocean City, where there is a break in the sand dunes known as the Five Mile Level, we found a good sized colony of Terns nesting. At once I recognized them as the Roseate Tern by their loud, sharp notes which differ decidedly from those of the Common Tern (*Sterna hirundo hirundo*). To make their identity absolutely certain I had McDermott cover me with a blanket piled with drift trash within a few feet of the nests. Within ten minutes all had settled on their eggs and all were Roseate Terns. Some of the nests composed of drift material, while the others were merely slight depressions in the sand. The eggs can be readily distinguished by an experienced oologist from those of the Common Tern though there are sets in each species that overlap. No other species of Tern were nesting within several miles of this colony. I know of no other breeding records for Maryland. The heavy storms of 1934 changed the entire shore line in this section and since I have not found these birds nesting in such numbers.—EDWARD J. COURT, *1723 Newton St., N. W. Washington, D. C.*

Unusual Birds in Central West Virginia.—During the first week in September, 1935, we had in central West Virginia almost continuous rain, accompanied by light-to-heavy east winds, evidently a product of the tropical hurricane that struck the Atlantic Coast from Florida north. The effect of this spell of weather was to drive into the state numerous sea and shore birds, with one or two land species that usually migrate near the coast.

On the evening of September 5, Mrs. Brooks and the writer were driving near Volga, Barbour County, West Virginia, when our attention was called to flocks of birds flying over a flooded meadow. When we stopped the car we realized that this and

other nearby meadows were occupied by large numbers of shore birds, and the appearance of the place strongly suggested the flooded meadows of southern New Jersey.

The birds were studied for two hours on the evening of the 5th, and again for the entire day of the 6th, when three other observers joined us. Glasses were used, and doubtful species were checked with Peterson's 'Field Guide' on the spot. One feature was the unusual tameness of many species that we were accustomed to think of as shy. Following is a list of the more noteworthy species seen:

Ixobrychus exilis. LEAST BITTERN.—Two individuals were noted in the rushes and cattails along a small swamp.

Querquedula discors. BLUE-WINGED TEAL.—Six individuals were seen in small ponds left by receding flood waters.

Coturnicops noveboracensis. YELLOW RAIL.—Feeding in the grasses along a small stream was a single individual of this species, and we had the pleasure of watching it for an hour or more, as it dodged in and out of the small flooded area. Twice we saw it swim for short distances. The status of this species in the state is somewhat uncertain, this being perhaps the second reported occurrence of it.

Charadrius semipalmatus. SEMIPALMATED PLOVER.—These birds were noted everywhere about the flooded meadows, accompanying the small Sandpipers just as in the tidal meadows of the coast. We counted thirty individuals.

Squatarola squatarola. BLACK-BELLIED PLOVER.—Although we saw several flocks of large dark Plovers, only two individuals were seen close enough to make identification certain. With our glasses, we particularly noted the white rumps and tails and the black axillary feathers. I do not know of any previous report of this species in West Virginia.

Bartramia longicauda. UPLAND PLOVER.—This species, not common at any time in West Virginia, was represented by several individuals. As might be expected, they were found around the dry edges of the meadows.

Tringa solitaria. SOLITARY SANDPIPER.—We are not accustomed to seeing these birds in large numbers in West Virginia, and one of the surprises of the flight was to see flocks rather than isolated individuals and pairs. We did not visit a swampy meadow or pool of standing water on September 6 without noting this species. It was seen near Century, Volga, and Boulder, all in Barbour County.

Totanus flavipes. LESSER YELLOW-LEGS.—Four individuals noted, calling as they flew from pond to pond.

Pisobia melanotos. PECTORAL SANDPIPER.—Two individuals studied at close range. Many others, apparently of this species, noted at a little distance.

Pisobia fuscicollis. WHITE-RUMPED SANDPIPER.—We counted eleven individuals whose distinct white rump referred them to this species. This bird has been reported from the state only a very few times, and not before in such numbers.

Pisobia minutilla. LEAST SANDPIPER.—Several individuals of this species came so close to us that we could see the yellowish legs distinctly. We believe that there were Semipalmated Sandpipers present also, but none were close enough to make sight identification reasonably certain.

Limnodromus griseus. DOWITCHER.—Five large flocks of these birds were counted, and they were very tame, allowing approach within a few feet when feeding. We estimated the total number seen as at least two hundred. The long bills and white on hind parts of the body were unmistakable. There is but one previous report of Dowitchers in West Virginia, that of Bibbee and Strausbaugh in Birds of West Virginia (Bul. 258, W. Va. Agr. Exp. Station).

Larus atricilla. LAUGHING GULL.—A single individual was seen and heard.

Chlidonias nigra surinamensis. BLACK TERN.—These birds, occasionally seen in the state, especially in late summer and autumn, were in nearly every intermediate plumage stage between summer and winter. Some were largely black above, while others showed large mixtures of white.

Dolichonyx oryzivorus. BOBOLINK.—We see very few Bobolinks in Central West Virginia as a general rule, and the very large flocks observed on September 6 and 7 were unusual. Several hundred individuals, scattered in parts of Barbour and Upshur Counties, were seen.

When it is remembered that West Virginia has no natural lakes, and very few extensive swamps, a better idea of the rarity here of most shore birds may be secured. —MAURICE BROOKS, *Dept. of Biology, West Virginia University, Morgantown, W. Va.*

Additions to the List of Ohio Birds.—Recent examination of specimens in the bird collection of The Cleveland Museum of Natural History by Dr. Harry C. Oberholser has resulted in the discovery of four new forms for the state of Ohio, as follows:

Troglodytes domesticus domesticus (Wilson). EASTERN HOUSE WREN.—There is one specimen of this form in the collection, obtained after it had been killed by flying into the tower of the Cleveland Terminal Building, May 19, 1933. The discovery of this specimen occurred during the course of study of material by Dr. Oberholser while working on his recently described Ohio House Wren (*Troglodytes domesticus baldwini*[1]) of the central northern United States and adjoining parts of southern Canada. In the elucidation of the range of the Ohio House Wren contained in the original description, there was mention of a specimen of the more rufescent Eastern House Wren for Cleveland, Ohio. Despite this previous mention, it nevertheless seems desirable to put on record the circumstances surrounding the capture of this specimen since it is the first and only one up to the present to have been taken in Ohio. It probably occurs more or less regularly in migration in the eastern part of the state and other specimens will doubtless be taken sooner or later.

Hylocichla guttata oromela[2] Oberholser. CASCADE HERMIT THRUSH.—A single male specimen was taken by Omar E. Mueller and Frank J. Tobin at Bay Point, April 7, 1932. Bay Point is a willow and poplar covered sandy point, bounded by Sandusky Bay on one side and Lake Erie on the other, in Danbury Township, Ottawa County. While working on material preparatory to describing the small, pale Cascade Hermit Thrush of the central mountains of northern California, Oregon, Washington, and southern British Columbia, Dr. Oberholser discovered that the single above mentioned specimen was referable to that subspecies.

Hylocichla fuscescens salicicola Ridgway. WILLOW THRUSH.—A male specimen was killed by flying into the tower of the Cleveland Terminal Building, September 17, 1931, and so found its way into the Cleveland Museum collection along with many other specimens which have met a similar fate during the last few years. The discovery of the Willow Thrush in Ohio during migration is not surprising since the normal migration route of this form cannot be far to the west of this state. Intensive collecting in western Ohio would probably show Willow Thrushes to be of more or less regular occurrence.

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[1] Oberholser, H. C. "Revision of the North American House Wrens." Ohio Journal of Science, vol. 34, No. 2, pp. 86–96, 1934.

[2] Oberholser, H. C. "Description of New Birds from Oregon Chiefly from the Warner Valley Region." Scientific Publications of the Cleveland Museum of Natural History, Vol. 4, No. 1, 1932.

Ammospiza caudacuta subvirgata (Dwight). ACADIAN SPARROW.—A specimen was collected by the writer September 20, 1931, at Richmond, Lake County, in a cat-tail marsh on Grand River about one half mile from Lake Erie. The occurrence of this maritime race so far from its native salt marshes was surprising in the extreme, and, as in the case of the Cascade Hermit Thrush, can only be explained as the result of accidental wandering of the bird far from its normal path of migration.—JOHN W. ALDRICH, *Cleveland Museum of Natural History.*

Notes from the Dry Tortugas.—I spent June 18–19, 1935 at the Dry Tortugas, Florida, primarily to ascertain the status of the famous Sooty and Noddy Tern colony there. These birds have been since 1903 under the protection of the U. S. Biological Survey and in a place rather far from the normal travels of man. However, conditions have changed. Fort Jefferson, on Garden Key, has been taken over by the National Park Service, apparently with the idea of making it a point of tourist attraction, and the protective arm of the Survey has been removed. Bird Key, long the site of the colony, has been destroyed and almost obliterated by hurricanes, and the birds have moved to Bush Key, a rapidly growing coral island just across the narrow channel from Garden Key. The birds, then, are more accessible than ever, and the project of making a national monument out of the old fortification may subject the Sooties and Noddies to an unprecedented amount of disturbance. For the present, however, it must be said that the custodian of Fort Jefferson is a very efficient protector of the colony, so much so in fact that he would not allow me sufficient time on Bush Key to estimate the bird population with any degree of accuracy.

Bush Key, in its present state of accretion, comprises probably fourteen or fifteen acres, a considerable portion of which is vegetated. It is much larger than Bird Key was in 1907 when John B. Watson began there his studies on homing instincts, and reported the area of Bird Key as 6,000 square yards. At that time, Watson reported about 19,000 Sooties and about 1500 Noddies in the colony. This figure may be compared with the report of Herbert K. Job, quoted in 'The Auk,' Vol. 21, p. 124, of 3600 Sooties and 400 Noddies, and the 1917 report (Smithsonian Institution Annual Report, 1917, p. 469) by Dr. Bartsch, of 18,000 Sooties and 4,000 Noddies. My best estimate of the 1935 population of the Tortugas colony is perhaps 35,000 Sooty Terns and 3,000 Noddies. The custodian, as mentioned, is so zealous to protect the colony that he would not permit me to attempt a count of nests. However, I was able to hazard an estimate of at least 35,000 birds by judging the area of the key, the percentage of total area occupied by birds, and the sampled number of birds per small areas selected for the purpose. The density as noted is very similar to descriptions published by Watson and others.

The Sooties were nesting on the ground; the Noddies mostly in small bushes, but there were some 200 nests in the sea-oats, and many on the ground with the Sooties. The Noddies were scattered pretty well over the Key, the only concentration being in the sea-oat patch to the south-east. One Noddy was nesting on a steel girder in the half-demolished coaling station on Garden Key.

Perhaps 15% of the eggs were hatched, with some young as old as 6 or 8 days. In the Noddy "sea-oat colony," two-thirds of the eggs were hatched, and of the young, two-thirds were in the brown or blackish phase.

On the sand-spit to the south-east were about 200 pairs of Roseate Terns, with several nests; 150 or 200 Least Terns, with some nests; and about 75 pair of Common Terns, nesting, also. From one to two hundred Frigate Birds were seen resting on the bushes or soaring about, but none was molesting the colony, so far as I observed.

Other birds noted at the Tortugas on June 18–19 include:—one Royal Tern, two Brown Pelicans, two adult and one immature White-bellied Boobies; one each of Ward's, Little Blue, Louisiana, and Yellow-crowned Night Herons (all on Garden Key); one Black-bellied Plover and six Ruddy Turnstones (on Bush Key); within the enclosure of Fort Jefferson we saw a Gray Kingbird, and *mirabile dictu*, a male Rose-breasted Grosbeak (the Grosbeak was reported by the custodian as having been seen for several weeks). In addition, a dead Pigeon Hawk, and a Duck Hawk in captivity (wounded), were noted, and on Loggerhead Key three Anis (in all probability *Crotophaga ani*).—R. J. Longstreet, *Daytona Beach, Fla.*

New Records for Mona Island, West Indies.—A small party mainly from the University of Puerto Rico, including among others Mr. J. Adger Smyth and the writer, spent three days from April 14 to 16, 1935, inclusive, making collections on Mona Island. The party landed at Uvero on the south coast, and made trips on foot to other parts of the island. During our stay we obtained the following records which appear to be new:

Falco peregrinus anatum. Duck Hawk.—Single individuals were noted at Uvero on April 14 and 16, and two at Playa de Pájaro, on the east coast, on April 15. Natives informed us that the species occurs there regularly.

Falco sparverius dominicensis. Hispaniolan Sparrow Hawk.—It seems surprising that no Sparrow Hawks have previously been recorded from Mona Island, as we found them rather common at Playa de Pájaro, and saw one at Uvero. A female was collected at the former locality on April 15, and two males the following day. The males appear rather unusual in their almost complete absence of spotting both on the lower parts and on the back, the under parts being nearly pure white with a buffy wash across the breast and only some very faint indications of black spotting on the flanks. The female shows only faint reddish brown streaking below, but all three specimens may be fairly closely matched by examples from the Dominican Republic in my collection, and I have no hesitation in referring them to *dominicensis*. The measurements of the Mona Island specimens are: males, wing 184.9–187.8 (average 186.3); tail 115.2–122.6 (average 118.9); culmen from base 18.6–19.9 (average 19.2); tarsus 36.9–40.0 (average 38.4); female, wing 190.6; tail 121.3; culmen from base 19.7; tarsus 39.2 millimeters. Four males from the Dominican Republic in my collection measure, wing 177.4, 178.7, 181.8, and 186.3 (average 181.0); tail 112.6, 115.2, 117.4, and 120.0 (average 116.3); culmen from base 18.6, 18.7, 18.9, 18.9 (average 18.8); tarsus 35.4, 35.4, 35.6 and 36.4 (average 35.7); and two females measure wing 181.9–187.3 (average 184.6); tail 120.5–120.7 (average 120.6); culmen from base 19.0–19.8 (average 19.4); tarsus 35.5–37.1 (average 36.3 millimeters). Although the Mona birds average somewhat larger than the Dominican, the difference is so slight as to scarcely justify recognition of the Mona bird as a separate race without additional material.

Arenaria interpres morinella. Ruddy Turnstone.—A flock of twelve was noted on the beach at Uvero on April 16.

Crotophaga ani. Ani.—Reported by some of our party near Uvero April 16, and said by natives to occur only at Sardinera, on the west coast, and at Uvero.

Previously, while passing near Mona Island on a steamer the writer noted two Red-footed Boobies (*Sula piscator*) a short distance off the coast on July 17, 1933.—Stuart T. Danforth, *University of Puerto Rico, Mayagüez, Puerto Rico.*

Albino Red-headed Woodpeckers.—On September 7, 1935, Mr. C. A. Diffenderffer, his son and I found two albino Red-headed Woodpeckers (*Melanerpes ery-*

throcephalus) with normal birds of the same species in a small oak grove at McDonough, Md., where they no doubt were raised. We watched them catching insects in the air after the manner of a Flycatcher and then procured one of the albinos. Its plumage was pure white with the exception of a few minute patches of red on the face and a slight tinge of gray on the tips of the primaries. The eyes, however, were black and the feet of the usual grayish black.—Brooke Meanley, *5111 Roland Ave., Baltimore, Md.*

Interesting Albinos.—On August 29, 1935, I trapped a Redstart (*Setophaga ruticilla*) at my home near Norristown, Pa., which was partly albino. The bill was pink and the fore part of the head white with white spots over the rest of it; the bristles on either side of the gape white and also the throat. There was a white secondary feather in one wing and one in the other wing was tipped with white and one white upper tail covert.

On June 12, 1935, a Catbird (*Dumetella carolinensis*) was taken which was nearly white. The under parts were grayish white with a slight tinge of reddish brown on the under tail coverts; the back was light gray and the head about the color that the back should have been. It presented an odd appearance and was not taken again.—Raymond J. Middleton, *Norristown, Pa.*

The Disposal of Shells after Hatching.—In Mr. Mousley's article on "The Birth of a Snipe family," he quotes the late F. Mentieth Ogilvie's observation on the European Snipe in this connection as well as those of Miss Turner and Messrs. Winnall and Yeates. For many years I have collected information from all available sources and made personal observations on this point and can only suppose that Mr. Ogilvie's experience was abnormal. Besides the two authors quoted by Mr. Mousley to the effect that the shells are left in the nest, I may add the testimony to this effect of Mr. J. Steele-Elliott (Zoologist, 1912, p. 197). Mr. E. Richmond Paton, the late Mr. E. B. Dunlop and my own personal experience. Extract from notes: "June 6, 1921. Flushed a Snipe from a nest with 3 nestlings in down. She did the 'injury-feigning' trick; the remains of the shells were in the nest, each egg being broken completely in half, with the blunt end fitted into the pointed end."—F. C. R. Jourdain, *Whitekirk, Southbourne, Bournemouth, Engl.*

Correction.—Certain changes made in my note on the Raven in Dane County, Wisconsin (The Auk, 52: 455) require the following corrections:

In the title, for "*Corvus corax* subspecies," read "*Corvus corax europhilus* Oberholser." The last sentence of the first paragraph reading: "This race, however, is not recognized in the A. O. U. 'Check-List' etc." should be deleted.—Leonard William Wing, *University of Wisconsin, Madison, Wisconsin.*

The Editor regrets that through an oversight of his these changes were incorporated in Mr. Wing's note instead of in a foot note as they should have been. The fact remains, however, that this race of the Raven is *not* recognized in the A. O. U. 'Check-List.'

It might be added for general information that ever since the first 'Check-List' was published the 'Editors' of 'The Auk' have taken the liberty of making the nomenclature of 'The Auk' conform to it unless the author explicitly desires to use some other name and to present arguments in favor of such change, in which case the A. O. U. concordance is given in a foot note.

Such a practice is obviously necessary since the great majority of our readers are acquainted only with the names in the 'Check-List' and when some other names are used without explanation the 'Editor' receives merited complaints.

Correction.—In a note on the occurrence of the White-tailed Kite in South Carolina (Auk, LII, p. 445) the writer through an oversight omitted mention of the Audubon records so that the observations listed should have been designated "the first for South Carolina" *since the time of Audubon.* The late Arthur T. Wayne casts some doubt on the Audubon records and there may have been a mistake in the breeding record but the others should stand.—ALEXANDER SPRUNT, JR., *R. F. D. 1, Charleston, S. C.*

RECENT LITERATURE.

Hellmayr's 'Birds of the Americas.'—The author and the Field Museum are to be congratulated upon the progress that has been made with this invaluable work;[1] two thick volumes within a year's time is a record of which anyone should be proud. Apparently only the Finches and Tanagers remain to complete the study of the Passeres and as Mr. Cory covered the "Picarian" families, the work will then be completed with the exception of the Raptores, Columbae and the "Water Birds" which were passed over by Mr. Cory until they should have been covered in Ridgway's 'Birds of North and Middle America,' which latter work, by the way, is not yet completed although seven years have passed since Mr. Ridgway's death.

Dr. Hellmayr has adhered rigidly to the plan followed in the preceding parts of this great work and we find the same abundance of information, the same accurate synonymy and the same helpful footnotes—for all of which systematic ornithologists of the world should be grateful. Only those who have undertaken work of a similar nature can appreciate the enormous labor that is involved.

As heretofore we are compelled from lack of space to limit our comments mainly to the treatment of North American species and the way in which it differs from that of the A. O. U. 'Check-List.'

In the Larks, Dr. Hellmayr prefers the generic name *Chionophilos* to *Otocoris* and recognizes the intermediate form *enthymia* Oberholser, both of which are opposed to the action of the A. O. U. Committee.

In the Swallows, the Cuban Martin (*Progne cryptoleuca*) is made a subspecies of *P. subis;* the specific name of the Cliff Swallow is changed to *pyrrhonota* (Vieill), based upon Azara, who according to Dr. Hellmayr's interpretation described a wintering North American individual; likewise he finds Lembeye's name *coronata* applicable to the Cuban Cliff Swallow named by Barbour and Brooks, *Petrochelidon fulva cavicola;* our Barn Swallow becomes a subspecies of *Hirundo rustica* of Europe and the genera *Chelidonaria* and *Delicon* are united.

In his treatment of the Vireos Dr. Hellmayr rejects *olivaceus* for the Red-eyed Vireo because Linnaeus cited references to several species and it is impossible to state which he had principally in mind, but if this principle were to be followed rigidly we should have to reject a good many names of Linnaeus, Gmelin and others! We see no reason to reject such names as the first revisor principle enables us to follow the custom of years and avoid complicating our nomenclature. *Vireo chivi* is rejected as unrecognizable and *V. calidris* and its races, as also *V. flavoviridis*, become subspecies of *V. virescens* (= *olivaceus*).

Coming to the Laniidae, we find our Northern Shrike, like our Barn Swallow, placed as a subspecies of the European species (i. e. *Lanius excubitor borealis*) and under *L. ludovicianus* we find the statement that the name "might refer with equal degree of probability to either *ludovicianus, migrans* or *excubitorides*" but "it seems highly desirable to conserve the current use of the name." While we heartily endorse this decision we cannot but realize that it is directly contrary to the author's procedure in the case of *Vireo olivaceus* above! *L. l. grinnelli* and *L. l. mearnsi* rejected by the A. O. U. Committee are accepted.

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[1] Catalogue of Birds of the Americas. By Charles E. Hellmayr, Associate Curator of Birds, Field Museum of Natural History. Publication 347. Zoological Series, Vol. XIII. September 16, 1935. Pp. 1–541. Part VIII; Alaudidae — Hirundinidae — Motacillidae — Bombycillidae — Ptilogonatidae — Dulidae — Vireonidae — Vireolaniidae — Cyclarhidae — Laniidae — Sturnidae — Coerebidae — Compsothlypidae.

The genera *Aethiopsar* and *Acriditheres* in the Starlings are united and in the Honeycreepers, not only *Coereba bahamensis* but all of the thirty-fives pecies and subspecies of this genus, are made subspecies of *C. flaveola*!

There are a number of changes in the Wood Warblers from the arrangement of the 'Check-List': *Vermivora celata orestera, Peucedramus olivaceus arizonae, Dendroica aestiva amnicola, Seiurus aurocapillus furvior* and *Geothlypis trichas insperata* are recognized (the second and last not having been published in time for consideration by the Committee); *Compsothlypis graysoni* becomes a subspecies of *C. pitiayumi* and all of the Mangrove Warblers are united with the Golden Warblers under the specific name *petechia* while in a footnote the author predicts the necessity of further uniting them all with the Yellow Warblers because "their derivation from a common ancestral stock seems hardly in doubt"; the Long-tailed Chat becomes *Icteria virens auricollis* Bp. this name having been shown by van Rossem to have priority. While Dr. Hellmayr retains *Euthlypis*, he states in a footnote that it is a "very poor genus which had better be united to *Basileuterus*" yet curiously enough he separates them by the very distinct *Ergaticus*.

As additional instances of the treatment of quite distinct species as subspecies in one specific group we might mention *Vireo crassirostris* placed under *V. griseus* and the brown bellied *Diglossa brunneiventris* under the gray bellied *D. carbonaria* although the two latter occur within a few miles of one another in Bolivia.

While with the exception of a few demonstrated cases of priority, the changes above listed, and many more in the case of tropical American groups, are purely matters of personal opinion we cannot but regret that Dr. Hellmayr has adopted such an extreme stand in the increase of subspecies and the reduction of species. We had thought that the term "formenkreis" indicated a convenient grouping of both species and subspecies with common ancestry, but his interpretation would seem to make it synonymous with "species." His nomenclature, therefore, indicates primarily or exclusively evolutionary relationship. We have, however, always claimed that a name had another function that of furnishing a handle by which we may let others know what we are talking about, and just as we extend its evolutionary indication we curtail its usefulness in this latter field. Moreover, in the case of the Yellow Warblers and their allies when we unite them all under one specific name we indicate a common ancestry, it is true, but we entirely lose sight of the fact that there are three well distinguishable groups. Is not the one fact just as important as the other?

There are two additional points in Dr. Hellmayr's treatment on which we think that he is in error in his conclusions. In changing the name of the Blackpoll Warbler from *striata* Forster to *breviunguis* Spix he claims that *Muscicapa striata* Forster (1772) is barred by *Motacilla striata* Pallas (1764). This is contrary to the Canon XXX of the Revised Code of the American Ornithologists' Union. These names were originally proposed in different genera and are in different genera today; one therefore does not preclude the use of the other unless they are now regarded as congeneric.

In the case of the Townsend specimens from the "Columbia River" we do not think that the Washington and Cambridge specimens can be regarded as "co-types." Most of the new species were described in the 'Journal of the Academy of Natural Sciences of Philadelphia' and we maintain that the specimens retained there are the types. The "duplicates" were sold to Audubon and others and they are the ones now in other museums.

We wish Dr. Hellmayr all speed with his remaining volumes. They will be our standard reference work in all studies of the birds of the Americas for many years to

come and the convenience of the volumes already at our disposal makes us all the more anxious for the others that are to come!—W. S.

Bond's 'Birds of the West Indies.'—While several excellent works on the birds of individual islands in the West Indies group have appeared during the past few years, there has been no book on the avifauna as a whole since Charles B. Cory's 'Birds of the West Indies' published in 1889, and this consisted entirely of descriptions, synonymy and a brief statement of range.

The work[1] before us is quite different in plan being designed, as the author tells us, "to combine the technical with the popular" and we think that he has most successfully realized his idea. There are good original descriptions of all of the species and detailed statements of their range, while line cuts and one colored plate from originals by Earl L. Poole serve as excellent illustrations. For interesting sketches of the habits and details of nesting, song, etc., the author has drawn largely upon his personal experiences during ten trips to the islands.

He has endeavored, like a number of other authors, to use the "species" as his systematic unit referring to the subspecies only in the paragraphs on distribution and nesting, although the particular race upon which his description is based is always given and the ways in which other races vary from it. The species which are only winter or casual migrants from the United States or elsewhere, are treated together at the end of each family, after the endemic species, and without the generic headings provided for the latter. The accounts of habits and nesting are presented under the generic heading as most of the West Indian endemic genera are montypic and it was thought that it would require much repetition in other cases to discuss these matters under each species separately. Synonymy and references to places of publication are omitted as they are apart from the main object of the book and even the authorities for the names are omitted in the main text but are to be found in a complete list of the species and races given at the end of the volume. An additional valuable feature of the work is a list under each species of its local names in English, French or Spanish as the case may be.

In the introduction the author discusses the faunal relationship of the West Indies and points out the preponderance of North American types in its bird life. We cannot place too much weight upon this fact, however, as the relationship of the mammals, especially of the fossil forms, is Neotropical and the fauna of the group was doubtless acquired at different times and from different sources as geological conditions and land connections changed. There are also helpful suggestions to those who visit the islands as to how to obtain an idea of their avifauna which will be very welcome to tourists. Mr. Bond is peculiarly well fitted for the task which he has performed so satisfactorily, as he has personally visited no less than 50 of the islands and has discovered several hitherto unknown races as well as rediscovered two species that were supposed to have been exterminated.

The 'Birds of the West Indies' will prove a handy reference book as well as a field handbook both for visitors to the islands and natives who desire to know something of the bird life about them. We congratulate Mr. Bond upon a task well done.—W. S.

Priest's 'Birds of Southern Rhodesia.'—The third volume[2] of this excellent work has recently appeared covering the Broadbills, Pittas, Larks, Pipits, Babblers,

[1] The Birds of the West Indies. By James Bond. Academy of Natural Sciences of Philadelphia. 1935. Pp. i–xxv + 1–455. Price $4.50. [Reviewed from final proofs.]

[2] The Birds of Southern Rhodesia. By Captain Cecil D. Priest, etc. etc. Vol. 3. William Clowes and Sons Ltd., London and Beccles, 1935. Pp. i–ix + 1–355. Price 30 shillings. To be had from the publishers, 94, Jermyn St., London, S. W. 1.

Bulbuls, Flycatchers, Thrushes, Warblers and Swallows. The fourth volume, which we understand is about ready to go to press, will complete the systematic treatment but the author contemplates a supplementary fifth volume to set forth the varied character of the country and the habitats of the birds, with numerous illustrations.

The volume before us follows exactly the plan of its predecessors as already described in these columns (Auk, 1934, p. 263). The colored plates, which like most of the text figures are from pencil drawings by Norman Lighton, of Pretoria, are unique in the fact that the birds only are in color, the background etc. being in gray halftone.

There is much of interest to the general reader in Capt. Priest's volumes beside the descriptions and distributions which constitute matter for future reference. It is interesting to read that when the flights of locusts are on at Chiferi Bluff "every bird seemed to disappear from off the face of the earth. One would find a lovely Paradise Flycatcher cowering under the banks of a small stream with his long tail dangling in the water; an Eagle would quickly be forced to earth; small birds hid in the dense underbrush; no bird sang—none were to be seen."

There is an interesting account of the "Long-claw" or "Cut-throat Lark" (*Macronyx*), a Pipit with almost exactly the same pattern of coloration as our Meadowlark. We learn that "as soon as the grass is burnt we notice them by the side of the road fluttering away with their wings vibrating rapidly, the tail extended in a fan shape. They will alight in some patch of unburnt grass and hide till we have passed." Evidently they resemble our Meadowlark also in habits and we wonder whether there is not some curious relation between these two resemblances of color-pattern and habit.

Larks abound in Rhodesia, no less than six species being found there. One of the most interesting is the "Flappet Lark" (*Mirafra*) "which has the singular habit of rising 15 or 30 feet perpendicularly, making a sharp cracking sound with its wings, uttering a long shrill *phew* and then falling as abruptly as a stone might. This action is repeated at intervals of a minute or two for an hour or more." Other Larks (*Eremopteryx*) are of the build and size of the English Sparrow and are appropriately known as "Sparrow Larks." Rhodesia also possess no less than eleven species of Pipits and Wagtails and fifteen Swallows in striking contrast to our comparative paucity of such birds.

There are three appendices to the volume. One consisting of a biography of Linnaeus reprinted from Jardine's 'Naturalist's Library'; another presenting an account of the Fish-eating Owl (*Scotopelia*) additional to that in the previous volume, and the last on the breeding habits of *Gymnogenys* and sketches of two Rhodesian ornithologists—Thomas Ayres and Johan C. D. Wilde. We wish Capt. Priest all speed in the completion of his excellent work.—W. S.

Systema Avium Rossicarum.[1]—This important work[1] has been published in instalments in 'L'Oiseau et la Revue Francaise d'Ornithologie' from July, 1933, to October 1, 1935, and will be continued in that journal. The Accipitres, Striges and Passeres have now been completed and they are published separately as volume I of the work which is entirely by G. P. Dementiev, the remaining groups which will constitute volume II, will be by S. A. Buturlin.

All species and subspecies recorded from within the limits of the U. R. S. S. (both Russia and Siberia) are included, and each is treated in exactly the same manner

[1] Systema Avium Rossicarum (Catalogue critique des Oiseaux de l'U. R. S. S.). Volume I. Accipitres — Striges — Passeres. Par Le Professor Georges P. Dementiev, Chef de la Section Ornithologique du Musee Zoologique de Universite de Moscou. etc., Paris, 1935. To be obtained in America from Dr. Ernst Mayr, American Museum of Natural History, New York, $1.25 plus postage. Pp. 1–288, pll. 8 and map.

regardless of whether it is denoted by a binomial or trinomial name, just as is done in the recent A. O. U. 'Check-List' and other modern check-lists. Under the name is given the original reference and the type locality, followed in many cases by the more important synonyms, and finally a more or less detailed statement of distribution with frequent discussion of relationship of related races and in the case of the Nutcracker with a list of its periodic occurrences. No less than 709 forms are listed and the study has been based mainly upon the collections of the University of Moscow.

The work is thus, as the author states, a critical systematic and geographic revision of the avifauna of the region which it covers. The plates published in 'L'Oiseau' are included and there is an introduction by M. Jean Delacour to whose forethought and generous assistance the publication has been made possible.

It is a great boon to anyone working on Palaearctic ornithology to have such a reference volume, as much of the information contained applies to other countries besides the U. R. S. S. and we owe a debt of gratitude to all concerned with its production. It is particularly commendable that it is printed in French and not in Russian.—W. S.

Raven on Wallace's Line and the Distribution of Indo-Australian Mammals.[1]—While this in entirely a mammalogical paper, the subject matter is of such interest to ornithologists that some notice of it in these pages seems warranted. Mr. Raven's object was primarily to refute the statement of Dr. N. Van Kamopen to the effect, "that such a sharp boundary as Wallace drew does not exist," not only where he drew it but nowhere in the archipelago. From his own extensive knowledge of the region, and from an exhaustive search through the literature, Mr. Raven has tabulated the distribution of no less than 2240 forms of mammals and plotted many of them on maps. As a result he "regards Wallace's Line as well established, since, except at its upper end it serves to mark the boundary of the old continental shelf, which was also the eastern limit of the great majority of East Indian mammals."

To quote from only one map we find not a single record of Marsupialia west of the line and no records of Proboscidea, Edentata, Perissodactyla or Dermoptera to the east of it! We may therefore retain our enthusiasm acquired many years ago when we first read the classic 'Island Life' and 'Geographic Distribution of Animals.'

Mr. Raven has done a fine piece of work, and his detailed discussion will be read with interest by everyone concerned with zoogeography.—W. S.

A Vertebrate Fauna of Forth.—This notable Scottish "Fauna"[2] has been planned as a continuation of the series proposed by the late Dr. Harvie Brown, all of which have now been published except those relating to the Clyde and Solway areas. The authors are thoroughly qualified for the work that they have undertaken for as long as the present editor of 'The Auk' has been reviewing the 'Scottish Naturalist' it has been his pleasure to notice the excellent annual "Reports on Scottish Ornithology" by Leonora J. Rintoul and Evelyn V. Baxter, indeed whenever the birds of Scotland are mentioned their names at once come to mind.

Scotland is rich in historic nature lore and the authors have traced the history of each species back to the earliest records with abundant recent observations by a host

[1] Raven, Henry C. Wallace's Line and the Distribution of Indo-Australian Mammals. Bull. Amer. Mus. Nat. Hist. Vol. LXVIII, Art. IV. Pp. 1–293. April 5, 1935.

[2] A Vertebrate Fauna of Forth. By Leonora Jeffrey Rintoul and Evelyn V. Baxter, Fellows of the Linnaean Society; Fellows of the Zoological Society; Honorary Members of the British Ornithologists' Union; Corresponding Fellows of the American Ornithologists' Union, etc. Oliver and Boyd, Edinburgh: Tweeddale Court, London: 33 Patternoster Row, E. C., 1935. Pp. i–iv + 1–397. Price 25 shillings net.

of present day ornithologists and bird lovers, all fortified by their own wide experiences. There are no descriptions nor technical discussions as the work is purely distributional and historical, the current English and Latin names only, being given in the heading of each species.

There are sixteen full page half-tone plates from photographs of birds or habitats, a colored map of the Forth drainage and attractive vignettes at the close of many of the chapters.

The information on character of occurrence, abundance, migration, etc., is well put together and forms not only interesting reading but an example of English composition of the highest order.

While the birds naturally comprise the major part of the text, annotated lists of the twenty-one mammals, which now or formerly occurred in Forth, and of the eleven reptiles and batrachians and one hundred and forty-two fishes will interest students of the cold blooded vertebrates. The admirable reviews of faunal relationship, migration, etc., are of general appeal.

The book is handsomly printed on the best of paper and both authors and publishers deserve great credit for the production of a most important contribution to ornithological literature.—W. S.

Hachisuka's 'The Birds of the Philippine Islands.'—The fourth part of this handsome work,[1] completing volume II, has appeared completing the Pittidae and covering the Swallows, Flycatchers, Cuckoo-Shrikes, Bulbuls and Babblers, leaving the remaining families of the Passeres to be dealt with in volume III. The printers have maintained the high standard set in the previous parts of the work and the colored plates by Grönvold, Keulemans, Frowkawk, Horsfall, Smit and Koyabashi, reproduced in several ways present a fine appearance. Acknowledgements are made in the preface for the use of certain plates from old works, but we find no explanation for the verbatim descriptions taken from original authorities or from McGregor's 'Manual of Philippine Birds' without quotation marks, an oversight that might well have been corrected.

We note as new the genus *Borisia* (p. 416) type *Zosterornis dennistouni* O-Grant; *Pitta erythrogastra yairocho* (p. 259), Sibutu Island; and *Muscicapula hyperythra mindorensis* (p. 299) Mindoro; while among the plates is one by Horsfall depicting two of Dr. E. A. Mearns's discoveries—*Pseudotharrhaleus caudatus malindangensis* and the unique *Leonardina woodi* neither of which we think has been previously figured.

We trust that the concluding volume of this important work may be completed at an early date so that the entire Philippine avifauna may be placed before us in convenient and attractive form.—W. S.

Pinto's 'Birds of Bahia.'—This excellent publication[2] is based upon the results of a collecting expedition undertaken November, 1932–April, 1933, in the interests of the Museu Paulista and the Museum of Comparative Zoölogy and covering several localities in the state of Bahia; along the rivers to the west of the city of that name; and at points south to the Rio Jucuruca. Under each species the author presents the synonymy so far as it relates to Bahia, a list of the specimens obtained on this and previous expeditions, and a discussion of relationship, distribution and habits.

[1] The Birds of the Philippine Islands. By The Marquess Hachisuka. Part IV, pp. 257–469, pll. 42–62. H. F. and G. Witherby, 326 High Holborn, London, W. C. 1. July 31, 1935.

[2] Oliverio M. de O. Pinto. Aves da Bahia Notas criticas e Observaçoes sobre uma collecçao Feita no Reconcavo e na-Parte Meridional do Estado. Separata da Rivista do Museu Paulista da Universidade de S. Paulo Tomo XIX, pp. 1–326, 1935. [In Portugese with a brief abstract in English.]

There is, as an introduction, an account of the itinerary of the expedition with numerous photographs of the country through which it passed and methods of transportation.

Six species are recorded for the first time from Bahia and six others are described as probably new to science; two of the latter have already been published by the author and the others appear in the present report: *Myiornis auricularis berlepschi* (p. 207) Cajazeiras; *Myiozetetes similis pallidiventris* (p. 212); *Attila rufus hellmayri* (p. 231) Cajazeiras; *Tachyphonus rufus subulirostris* (p. 268) Bomfim. In an English abstract at the end of the work there is listed "*T. r. rubrirostris*" as a new form described and while it apparently refers to the last mentioned race there is no page cited so that it will remain a nomen nudum while the name "*subulirostris*," also published in the index, will prevail even though it is to all appearances a misprint for the other!

An outline map of Bahia is a valuable aid to localities.—W. S.

Pirnie's 'Michigan Waterfowl Management.'—Discussions and controversies on wild-fowl management have flourished ever since the serious decrease in the number of game birds became apparent. Whether any general agreement on the matter will be attained before the birds are exterminated remains to be seen. Our main hope would seem to be through education and while that is a very slow process any publication that tends to spread reliable information without stirring up antagonism is to be welcomed, and Dr. Pirnie's book[1] is of that sort.

In a word of praise for Phillips and Lincoln's 'American Waterfowl' he truly says that it "takes up the discussion at a point a little too far along" for the everyday man and this book is designed to fill the gap. This it seems admirably fitted to do and to present to the Duck-gunner, the Duck-club manager, the conservation officer and the legislator the facts that they should know and without their coöperation wild-fowl conservation would seem to be doomed.

Dr. Pirnie begins with brief accounts of the best known water-fowl of Michigan and something on their dispersal and migrations. Then follows a statement of their present status and the effect of droughts and food shortage. Then comes a chapter on enemies—predators, disease and parasites, and another on hunting, in which the part man has played in Duck destruction is fairly and forcibly presented. Part two of the work discusses the more complex problem of wild life management and the waterfowl program with a detailed account of food plants, artificial propagation of Ducks and restoration.

We are only able, in our limited space, to mention some of Dr. Pirnie's remarks which strike us as particularly apropos. In the matter of predator control he emphasizes the inaccuracy of judging a supposed predator upon circumstantial evidence. Many a bird of prey has been killed because it was caught eating a dead Duck which had died of lead poisoning or disease, and he quotes a comment of a shrewd observer who asked "if you found a rat feeding on a dead horse would you think he killed it?" "The chief function of useful predator control is to discover when and where any wild animals are doing sufficient damage to wildlife to justify remedial measures. Control work should employ only those practices which of themselves are decidedly less destructive to wildlife than the predators which are condemned." If our sportsmen would only listen to advice of this sort instead of the arguments of the ammunition makers our Hawks and Owls would be saved from the extermination which now threatens them. The only point upon which we differ

[1] Michigan Waterfowl Management. By Miles David Pirnie, Ph.D., Dept. of Conservation, Game Division. Lansing, Michigan, 1935. Pp. i–xxi + 1–328. Price $1.50 post paid.

with Dr. Pirnie in this predator discussion is his opinion that it is "rather unnecessary and unwise to completely outlaw the use of pole traps"—simply because they are more efficient in catching Horned Owls than any other trap.

He wisely says that "Pheasant farms, deer refuges, fish ponds, and duck sanctuaries are not ultimate goals; they are only steps in the program to obtain additional recreation, sport and healthful activity and possibly create new vocations for a greater number of people. Social and economic aspects should not be lost sight of in the maze of such details as the best dates for shooting seasons or how to grow more pheasants per acre." In this same line of thought we should add the oft repeated fact that wild life belongs to all and if a thousand individuals get a great delight in the sight of a living Goshawk or Horned Owl why should these splendid birds be killed to meet the demands of the ten who desire to kill for sport the Ducks or other game which the birds have always relied upon for food? If we could have State Conservation Committees instead of Game Commissions we should cover the whole problem more satisfactorily and be able to serve the many instead of the few, and there would still be plenty of hunting for those who desire it.

Dr. Pirnie has written a splendid book which should be in the hands of as many men as possible. It is well printed and illustrated with many half-tones of birds, landscapes, food plants, etc., ect., and a good state map.

The Michigan Department of Conservation and the W. K. Kellogg Bird Sanctuary of which the author is in charge, deserve to share the credit for this excellent publication.—W. S.

Every Garden a Bird Sanctuary.—This is a British book[1] of a kind of which we have had a number in America but any helpful word on the subject is welcome and we can gain important new ideas from the perusal of Mr. Turner's little volume. He begins with an appropriate and unfortunately too true quotation of Lord William Percy that: "There is a sad irony in the fact that this period of awakening interest in these subjects has synchronized with a phase of human civilization which has involved such wholesale and world-wide decrease in wild life that it has become clear to all that the preservation, even of that remnant which survives, will tax the ingenuity and coöperation, not merely of groups of individuals but of groups of nations." Following are instructions for providing natural shelter, berry bushes, nesting boxes, feeding shelves etc. Also discussion of woodland and marsh sanctuaries. The information is well presented and the little book should do a world of good.

Most interesting to Americans, just at the moment, is the account of the Desborough and Gurney estates where game has been successfully reared and shot for years and where no Hawk or Owl is ever killed! Why do our so-called sportsmen allow themselves to be misled by the plea of the manufacturers of guns and ammunition for the extermination of predators?—W. S.

Sutton on Juvenal Plumages.—With the coöperation of the Cranbrook Institute of Science Dr. George M. Sutton has published an interesting paper[2] on the juvenal plumage and post-juvenal molt of seversal North American Sparrows with beautiful colored plates of eight of them in this early plumage, reproduced from his original paintings. These represent the Cardinal, Indigo Bunting, Towhee,

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[1] Every Garden a Bird Sanctuary. By E. L. Turner, F.L.S. With Plates and Drawings, London. H. F. and G. Witherby, Ltd., 326 High Holborn, 1935. Pp. 1–190. Price 5 shillings net.

[2] The Juvenal Plumage and Postjuvenal Molt in Several Species of Michigan Sparrows. By George Miksch Sutton, Cornell University. Bull. No. 3, Cranbrook Institute of Science, Bloomfield Hills, Michigan. September, 1935. Pp. 1–36.

Savannah Sparrow, Henslow's Sparrow, Chipping Sparrow, Field Sparrow and Song Sparrow as found in Michigan.

Dr. Sutton emphasizes the fact that the juvenal plumage is rarely a complete plumage, some of the body feathers usually being replaced by those of the first winter plumage before the flight feathers are fully grown. This fact is well-known to those who have tried to collect specimens in "full juvenal" plumage and they, like the reviewer, have doubtless come to the opinion that in some species at least such specimens simply do not exist! In order to properly depict the early body plumage Dr. Sutton has been compelled to use birds with "stubby" tails and short wings. The same thing is true, moreover, with later plumages and molts and in the case of shore-birds it is often possible to find specimens with feathers belonging to three different plumages.

In this connection it has always seemed to us that our nomenclature is at fault for we sometimes use the term "plumage" to indicate a set of feathers belonging to the same sequence and at others the dress in which the bird may be at a given time, often comprising feathers belonging to different sequences. A full feathered autumn bird freshly molted is really in the same "plumage" as a spring specimen in which the feathers have suffered marked wear, even though its appearance has been materially altered by the latter process.

Dr. Sutton, quite rightly, criticizes certain authors for their statements regarding the length of time that the juvenal plumage is worn. The finding of birds in this plumage at the beginning and the end of summer is no proof that the same individual had retained this plumage throughout that period. As a matter of fact, the duration of the juvenal plumage is, as he points out, probably quite short.

Perhaps the most important point brought out by Dr. Sutton's studies of young birds is the apparent additional partial plumage that the Cardinal assumes as the juvenal plumage is lost and before the "first winter" dress is acquired. So far as I am aware no previous author has called attention to such a plumage. Dr. Sutton suggests that this may be in fact the "first winter plumage" crowded forward from the usual time and that the familiar winter plumage is really the nuptial plumage acquired in autumn instead of in spring. He supports this theory by the argument that it is unusual for a bright plumaged bird to have no more of a molt in spring than that which the Cardinal shows, the spring dress of which differs from the winter garb mainly by wear. We are not prepared to endorse this line of argument however, since a number of dull plumaged birds have a complete spring molt and we have been unable to find any connection between the brilliancy of plumage and the amount of the molt.

In the case of the Savannah Sparrow Dr. Sutton finds two "phases" of juvenal plumage, one much duller than the other. There are many other interesting points brought out in his detailed discussion of the several species which limited space prevents us from taking up. Our readers should see the paper in its entirety as it is one of the most notable contributions to the study of plumages and molts that has appeared for many years, and shows that the last word has not yet been said upon this fascinating subject.—W. S.

Chapman on the Courtship of Gould's Manakin.—Dr. Chapman always makes good use of his winter sojourns to Barro Colorado and he has just published a study[1] of the life history of Gould's Manakin as observed in 1932 and 1935

[1] The Courtship of Gould's Manakin (*Manacus vitellinus vitellinus*) on Barro Colorado Island, Canal Zone. By Frank M. Chapman. Bull. Amer. Museum Nat. Hist., LXVIII, Art. VII. Pp. 471–525. September 30, 1935.

which is the most interesting account of bird behavior that we have read for many a year—admirably presented; based on most careful observation and teeming with suggestion.

After a brief résumé of the peculiarities and distribution of Manakins in general and a description of the peculiarly modified wing feathers of the males of certain species, by the aid of which they make the characteristic snapping sounds, our author discusses the activities of the species to which he has given particular attention.

The males at the beginning of the mating season clear the leaves from small areas in the forest making little "courts" to which they endeavor to attract the females. There are usually four or five males located within some thirty feet of one another and when a female arrives in the neighborhood they begin a display with rapid flitting across their respective courts and constant emition of the snapping sounds. If the female is in the proper sexual condition she responds to one of the males and joins in his "dance" which in the complete fulfillment of the demonstration results in coition. She seems to come in contact with the male only on the court as she alone builds the nest and rears the young, so that there is no real pairing of the birds as in most other species. Dr. Chapman gives many details of his interesting observations as well as the results of introducing stuffed birds on the court, and also discusses many other factors which may influence the behavior of the birds.

His final summary as to the development of peculiar structures and the object of the Manakin's complicated behavior is presented as follows: "that natural selection, working through the performance of the fundamental sexual relation, has developed specialized structures and coöperative habits which, rigidly followed throughout an extended breeding season, overcome the high mortality of tropical nest-life and produce a successful species."

He quotes the published observations of several ornithologists on different species of Manakins, and while we do not suppose that he intended this as a complete list of such contributions we wonder if he has overlooked Mr. Ernest G. Holt's interesting account of the competitive "dance" of three males of *Chiroxiphia caudata* before a single female, published in 'The Auk,' October, 1925, which he does not mention.

This paper of Dr. Chapman's should be read by all interested in bird behavior especially with reference to sexual activities.—W. S.

Sumner on Protective Coloration.—In three interesting publications[1] Prof. Sumner discusses the problem of protective coloration from several angles and presents the results of important experiments in this field. Specimens of *Gambusia patruelis*, the mosquito fish, which has the faculty of changing its tone of coloration in accordance with its surroundings, were placed in black and white aquaria and the resultant black and white fishes were then placed together in equal numbers in similar aquaria and a Penguin and a Night Heron introduced into each. In the pale tank 61% of the fishes eaten were black and only 39% white, while in the black tank 74% of white fishes were eaten and only 26% black.

Prof. Sumner rightly claims that this is pretty positive evidence of the protective value of chromatic adjustment of fishes to their backgrounds. In the course of his discussion Thayer's claim that all colors of animals are of concealing value, comes in for sharp criticism but high value is placed on the same author's demonstration of the optical principles underlying concealment. McAtee's conclusion, in the case of

[1] Does "Protective Coloration" Protect? Proc. Nat. Acad. Sciences XX, No. 10. October, 1934. Studies of Protective Color Change, III. Ibid. XXI, No. 6. June, 1935. Evidence for the Protective Value of Changeable Coloration in Fishes. Amer. Naturalist, LXIX, May–June, 1935.

insects eaten by birds, that "availability undoubtedly is the chief factor involved" is granted but his further deduction that "the phenomena classed by theorists as protective adaptations have little or no effectiveness," is not.

Prof. Sumner's object in his experiments is to demonstrate that there is such a thing as survival value in protective coloration and he regrets that the extravagant claims of some writers have led many biologists to discard the whole theory. He has done an important piece of work and demonstrated the possibility of convincing proofs through actual experiment.—W. S.

Mitchell's 'The Passenger Pigeon in Ontario.'—In spite of the many publications on the Passenger Pigeon there seems to be much information still to be obtained and the present publication[1] is a striking example of what can be done even at this late day. In 1926 the Royal Ontario Museum of Zoology issued a questionnaire with the object of securing information on the bird from those who remembered it and Miss Mitchell has been engaged in tabulating this information and in collecting a mass of additional data from early Canadian and American literature. The result is the most important history of the bird, so far as care in selection and use of data and in scientific method of treatment are concerned, that has yet appeared and the Museum authorities as well as the author deserve great praise for prosecuting such a piece of research.

It is impossible in the space at our disposal to begin to describe the information condensed in this publication which our readers must study for themselves; but it would seem that every angle of the Pigeon problem had been considered. There are long tables of nesting colonies, occurrences at other times and migrations; for all of the counties of Ontario, and much information for other parts of the continent, as well as interesting discussions of the various phases of the life of the bird, its destruction, etc.

Among the most important items are a reproduction in colors of a painting of the bird made by William Pope in 1835 and an old newspaper cut of a Pigeon flight in northern Louisiana sketched by Smith Bennett, showing the flock spread out on a rather wide company front but stretching away to the horizon like a column of smoke. There are also many other comments on the form of the flock.

The last specimen still extant for Ontario seems to be one in Mr. J. H. Fleming's collection taken on October 11, 1890, although there are "sight records" as late as 1902! There is also a photograph of the Pigeon habitat group in the Royal Ontario Museum.—W. S.

A Soil Conservation Bird Bulletin.—Ross O. Stevens of the Deep River, North Carolina, Soil Conservation Project has compiled a leaflet intended to interest school children in birds and to encourage outdoor bird study. Attention is drawn to the usefulness of birds, and notes are given on methods of attracting birds. The publication[2] contains reproductions of 6 larger colored bird pictures by J. L. Ridgway, and of 18 smaller ones by Lynn Bogue Hunt. It sets a fine example for Soil Conservation workers, who, recent developments indicate, may constitute one of the most important of our general conservation groups.—W. L. M.

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[1] The Passenger Pigeon in Ontario. By Margaret H. Mitchell. Contrib. Royal Ontario Museum of Zoology, No. 7, 1935. Pp. 1–181. Price $1.00 paper bound; $1.50 bound in cloth.

[2] Helping our Bird Friends, 15 pp., line drawings and colored figures, High Point, N. Car., Sept. 1935.

Other Ornithological Publications.

Alter, Chester M. and David O.—Herons along Big Flat Rock River in Rush County, Indiana. (Proc. Indiana Acad. of Science, Vol. 44, 1935, pp. 210–2.)

Anonymous.—The Conservation of Wild Life. (American Forests, Sept. 1935.)—Many old prints reproduced, with a history of organized conservation.

Bailey, Alfred M.—Nesting Days. (Natural History. April, 1935.)—With remarkable close-up photographs.

Barbour, Thomas and Porter, Margaret D.—Notes on South African Wild Life Conservation Parks and Reserves.—A Report prepared for the American Committee for International Wild Life Protection. 1935.

Beamer, L. H.—Great Migration of Snow Geese in the Neighborhood of Meaford, Ontario. (Canadian Field Naturalist, November, 1935.)

Bucher, Kathleen H.—Wol, the Sweet. (Nature Magazine, October, 1935.)—Story of a captive *Glaucidium siju* in Cuba.

Campbell, Bruce.—Notes on the Birds of Loch and Forest. (Scottish Naturalist. November–December, 1935.)

Carriker, M. A., Jr.—Descriptions of New Birds from Bolivia, with Notes on other Little-known Species. (Proc. Academy of Nat. Sciences Phila., LXXXVII, pp. 313–341, October 10, 1935.)—Thirty-three new subspecies and two new species are described from a collection made by the author during explorations extending from June 1934 to February, 1935, for the Philadelphia Academy.

Chapin, James P.—To Polynesia on the Yacht "Zaca." (Natural History, November, 1935.)—Account of the birds seen on the Crocker Expedition of 1934 and the collecting of material for bird groups for the American Museum of Natural History.

Clancey, Philip A.—Kingfishers Breeding in Juvenal Plumage. (Scottish Naturalist, November–December, 1935.)—The author's use of terms is not clear, just what are the plumages which he calls "juvenile" and "first summer"?

Crandall, Lee S.—The Most Beautiful Birds in the World. (Bull. New York Zool. Society, September–October, 1935.)—An account of the Birds of Paradise in Public and Private Collections, with many excellent photographs of the different species.

Craighead, Frank and John.—Hunting with Feathered Meteors. (American Forests, November, 1935).—Modern falconry, illustrated.

Crook, Compton.—The Status of the Black-billed Cuckoo in Tennessee. (Jour. Tennessee Acad. of Sciences, October, 1935.)—Seven nests are on record in the central basin, Cumberland Mountains and edge of the Blue Ridge.

deSchauensee, Rodolph M.—A New race of *Garrulax moniliger* from Northern Siam. (Proc. Acad. Natural Sciences, Phila., LXXXVII, pp. 409–410, November 21, 1935.)—*G. m. bakeri* (p. 409) Chieng Mai.

Farley, Frank L.—The European Starling in Alberta. (Canadian Field Naturalist, October, 1935.)

Friedmann, Herbert.—The Birds of Kodiak Island, Alaska. (Bull. Chicago Acad. of Sciences, Vol. 5, No. 3, September 10, 1935.)—An historical account with an annotated list of 142 species and subspecies and a bibliography.

Friedmann, Herbert.—Notes on Differential Threshold of Reaction to Vitamin D Deficiency in the House Sparrow and the Chick. (Biol. Bull. LXIX, No. 1, August, 1925.)—It has been indicated that in young chicks the secretion of the oil gland was necessary for the production of vitamin D and the prevention of rickets. The oil glands were removed from the experimented Sparrows but no case of rickets

developed—quite the contrary to the case in chicks. The author states that a differential degree of necessity for vitamin D may help partly to explain specific differences in food habits and possibly nutritional limiting factors in geographic distribution.

Goddard, T. Russell.—A Census of Short-eared Owls at Newcastleton, Roxburghshire, 1934. (Jour. Animal Ecology, May, 1935.)—Nesting habits and color variation.

Gross, Alfred O.—To the Strange "Buttons." (Natural History, September 1935.)—Account of the Bowdoin-McMillan Arctic Expedition of 1934 to the Labrador and the Button Islands.

Hamilton, D.—Increase of the Lesser Redpoll as a Breeding Species in the Lothians. (Scottish Naturalist, September–October, 1935.)

Kalman, Warga.—The Kisbalaton Heronry. (Kulonlenyomat Novenyvedelem 1930, March–April. [In Hungarian.]

Kipp, Duane H.—Closed Season—No Bag Limit. (American Forests, October, 1935.)—Camera hunting has replaced gun hunting in the case of the author not because of any distaste for the latter but because of the entrancing character of the former.

Kuroda, Nagamichi.—*Chlidonias l. swinhoei* from Tokyo and Birds of the Borodino Islands, Japan. (Botany and Zoology, January and July, 1935.) [In Japanese.]

Kuroda, Nagamichi.—A Very Small Example of *Dafila a. acuta* from Hokkaido. (Dobutsugaku Zasshi, 47.) [In Japanese.]

Kuroda, Nagamichi.—Notes on the Breeding Grounds of Certain Species of Anatidae in Japanese Territory. (Proc. Fifth Pacific Science Congress 1934.) [In English.]

Ley, Willy.—The Great Auk. (Natural History, November, 1935.)—A résumé of its history.

Ley, Willy.—The Roc of Ages. (Nature Magazine, December, 1935.)—Account of the mythical bird and its probable origin.

Lewis, Harrison F.—William Couper's Observations of Birds of the Labrador Peninsula. (Canadian Field Naturalist, October, 1935.)

Lak, David.—The Breeding Bird Population of British Heaths and Moors.

Lockley, R. M.—A Census of over Seven Years in Pembrokeshire. (Jour. Anim. Ecology, May, 1935.)—In the first study a density of from 20 to 100 adult breeding birds per hundred acres was found for various areas of heathland; in the second there was an average density of about 99 per 100 acres.

Luttringer, Leo A.—Hawks—What they Eat. (Nature Magazine, September, 1935.)

McClanahan, Robert C.—Fifty Years After. (Florida Naturalist, July, 1935.)—A comparison of a present day list of the birds of Gainesville, Fla., with one made by Frank M. Chapman, in 1926–27. Twenty species were seen only by the author and eighteen only by Chapman.

McCreary, Otto C. and Mickey, Arthur B.—Bird Migration Records from Southwestern Wyoming. (Wilson Bulletin, June, 1935.)

MacDonald, Dan.—Some Notes on the Habits of the Ruffed Grouse. (Canadian Field Naturalist, October, 1935.)

Manuel, Canuto G.—Three Bird Contrivances that are Indirectly Harmful to the Filipino Farmers. (Philippine Journ. Sci. 6(3), 1935, pp. 327–341, 8 Pls.)—Filipino boys like those of other lands seem to have a penchant for bird-killing. The imple-

ments chiefly used are airguns, slingshots, and snares. The use of these devices is described with lists of the birds chiefly destroyed by each, and their economic value. Notes on the food of 31 species are included.—W. L. M.

Mayr, Ernst and Rand, A. L.—Twenty-four Apparently Undescribed Birds from New Guinea and the D'etnrecasteaux Archipelago. (Amer. Museum Novitates No. 814, August 1, 1935.)

Mayr, Ernst.—Birds Collected During the Whitney South Sea Expedition XXX. Descriptions of Twenty-five New Species and Subspecies. (Amer. Museum Novitates, No. 820, October 10, 1935.)

Mayr, Ernst.—On the Nomenclature of Some *Aplonis* Species. (Mittl. aus Zool. Mus. Berlin, 20 Band, 2 Heft.)

Midlothian Ornithological Club.—Report of the Isle of May Bird Observatory. (Scottish Naturalist, September–October, 1935.)

Mendall, Howard L.—Wings of the Storm. (Nature Magazine, November, 1935.)—Cormorants of the Maine coast.

Mills, H. R.—Report on the Tampa Bay [Florida] Bird Rookeries. (Florida Naturalist, October, 1935.)

Naumberg, Elsie M. B.—Gazetteer and Maps Showing Stations Visited by Emil Kaempfer in Eastern Brazil and Paraguay. (Bull. Amer. Museum Nat. Hist., LXVIII, Art. VI. September 27, 1935.)

Pearson, T. Gilbert.—The International Committee for Bird Preservation. (Nat. Assoc. Audubon Societies, 1935.)—An interesting account of the Brussels meeting with group photograph.

Presnall, C. C.—The Birds of Zion National Park. (Proc. Utah Acad. Sci. Arts and Lett., XII, 1935.)—A Brief account of the region with an excellent annotated list and a bibliography by the Park Naturalist. To be had from the Zion-Bryce Nat. Hist. Asso., Zion Nat. Park, Utah, at 25 cts. per copy.

Riley, J. H.—Three New Forms of Birds from the Philippine Islands and Siam. (Proc. Biol. Soc. Washington, 48, pp. 147–148, October, 31, 1935.)

Sawyer, E. J.—Attitudes of Birds. The Song Sparrow's Individual Characteristics. (Nature Magazine, October, 1935.)—Fifty-five poses of the species in small pen sketches.

Shaver, Jesse M. and Crook, Compton.—Birds on the Campus of George Peabody College for Teachers, Nashville, Tenn. (Jour. Tenn. Acad. Sci., October, 1935.)—A discussion of the fifteen resident species and their fluctuation in abundance during the year. A second instalment (April, 1935) lists the spring transients with dates of arrival.

Saunders, W. E. and Lord, F. P.—Thrush Songs. (Canadian Field Naturalist, November, 1935.)—Bicknell's, Gray-cheeked and Olive-backed Thrushes.

Sheldon, H. P. and Grimes, Frank G.—Game Laws for the Season 1935–36. To be had from the Supt. of Documents, Washington, D. C., 5 cts.

Schmitt, Waldo L.—The Galapagos Islands One Hundred Years after Darwin. (Nature Magazine, November, 1935.)—An interesting and well illustrated account.

Stillwell, Jerry E.—Slaughter of the Bob-whites. (Farm and Ranch, April 15, 1935.)

Stillwell, Jerry E.—Birds of the Dallas Region. August 15, 1935. [Mimeographed.]—An excellent up to date list fully annotated, with references to published lists and much original data.

Thompson, Stuart L.—The Red-backed Sandpiper at Toronto. (Canadian Field Naturalist, October, 1935.)

Sutton, George M., and J. VanTyne.—A New Red-tailed Hawk from Texas. (Occas. Papers Mus. of Zool. Univ. of Mich., No. 321. September, 1935.)—*Buteo jamaicensis fuertesi* (p. 1)—We are sorry to see Mr. Peters and his followers overthrowing such a definite name as *borealis* for such an unrecognizable one as *jamaicensis* such action seems to be contrary to the best uses and interests of nomenclature. We wonder how many have looked into the matter for themselves and have consulted the late Outram Bangs' discussion.

Titus, Csorgey.—Bird Boxes, Bird Shelters, etc. [In Hungarian.]

Tyrrell, W. Bryant.—Bird Notes from Honga, Maryland. [Mimeographed.] (Bull. Nat. Hist. Soc. Maryland, V, No. 7, March, 1935.)

Tyrrell, W. Bryant.—The Youth of the Eagle in Maryland. (Maryland Conservationist, Fall issue, 1934.)

Van Tyne, Josselyn.—The Birds of Northern Peten, Guatemala. (Univ. Michigan Miscell. Publ., No. 27, August 1, 1935.)—A very important contribution to the ornithology of Guatemala, based upon a collection made by the author in 1931 together with material procured for the Biological Survey in 1923 by Harry Malleis, and some other specimens. *Timanus major percautus* (p. 8) is described as new and there is a list of twenty-one forms additional to Griscom's recent 'Distribution of Bird Life in Guatemala,' a good map and a bibliography. The author used an Italian and an Annamese net with great success in his collecting!

von Boetticher, Hans.—On the Systematic Position of the Ploceidae, Fringillidae and Sturnidae. (Senkenbergiana, XIII, 1931.)—An original scheme of classification of the Passeres is shown by a "family tree."

von Boetticher, Hans.—The genus Turacus. (Senkenbergiana, XVII, 1935.)—Regards *T. reichenowi* as quite different from the other forms which are arranged in three specific groups, *persa*, *livingstonii* and *schalowi*. For *leucolophus* he erects a new genus *Heuglinornis* (p. 150). Sclater in contrast recognized thirteen full species of *Turacus*.

von Boetticher, Hans.—Gaimard's Cormorant. (Vögel ferner Lander, 1935.)—A new subgenus, *Poikilocarbo* (p. 3) is proposed for *Phalacrocorax gaimardi* (Lesson). Although the author does not apparently definitely designate it as the type.

Wood, Casey A.—Curious and Beautiful Birds of Ceylon. (Smithson. Report, 1934.)

Ward, Harold.—Streamlining—Old and New. (Natural History, April, 1935.)—Many birds used in illustration.

Zimmer, John T.—Diagnoses of New Species and Subspecies of Furnariidae from Peru and Other Parts of South America. (Amer. Museum Novitates, No. 819. September 17, 1935.)

The Ornithological Journals.

Bird-Lore. XXXVII, No. 5. September–October, 1935. (Nat. Asso. Audubon Socs., 1775 Broadway, N. Y.)

Small Birds are not Decreasing. By Lawrence E. Hicks.—Cites the impossibility of making comparisons when accurate data do not exist and the unreliability of human memory. As to the northward extension of ranges which he cites, we are of the opinion that this too, is due in part to the lack of ability to identify birds in the past compared with the widespread accurate knowledge of today. It was only a few years ago that bird students in the southwestern part of Pennsylvania discovered that their Chickadees were the Carolina species.

Alden H. Hadley. By T. Gilbert Pearson.—With portrait.

Flying for Ducks. By William Vogt.—Airplane observations north of Winnipeg.

A Glider Highway. By Richard H. Pough.—Another account of Hawk Mountain, Pa.

Southern Ontario Birds. By W. E. Saunders.

The White Pelican. By Alfred M. Bailey.—At Great Salt Lake and other western colonies.

There is a new edition of the Kingfisher educational leaflet by R. T. Peterson; many short articles on sanctuaries and conservation activities, and the usual reports under 'The Season,' as well as an abundance of illustrations.

Bird-Lore. XXXVII, No. 6. November–December, 1935.

Birding in Southern California. By Clinton G. Abbott.

A Pair of Phainopeplas. By Laurence M. Huey.

The Great White Heron Today. By Alexander Sprunt, Jr.—Alarmingly reduced in numbers by the hurricane which swept over its limited nesting grounds.

A Herring Gull of Great Age. By T. Gilbert Pearson.—In captivity 46 years.

There is the usual educational leaflet, this time the Goldfinch, and accounts of the Annual meetings of the Audubon Association and the A. O. U.

Peterson's admirable portrait of the Acadian Owl adorns the cover.

The Condor. XXXVII, No. 5, September–October, 1935. (Cooper Ornith. Club, Mus. Vert. Zool., Berkeley, Calif.)

Experiences with Prairie Falcons. By Wright M. Pierce.—A young bird in captivity.

Over-Populations and Predation: A Research Field of Singular Promise. By Paul L. Errington.—A given environment has a definite carrying capacity for each species and it seems to be largely the over-population that is destroyed by predators. We really know practically nothing as to "the actual effect predation may have upon animal populations" or of "the increase or reduction of predatory species from the standpoint of animal populations." Modern ecological data indicate "that predation does not play nearly the part in determining population levels of wild species as was thought a comparatively few years ago."

An Analysis of the Bird Population in the vicinity of Rupert, Idaho. By William B. Davis.

Notes on Birds in Death Valley. By M. French Gilman.

Bird Records from the Tucson Region, Arizona. By C. Y. Vorhies, Randolph Jenks and A. R. Phillips.

Comments upon the Subspecies of Catherpes mexicanus. By J. Grinnell and Wm. H. Behle.—*C. m. punctulatus* and *C. m. polioptilus* both regarded as synonyms of *C. m. conspersus.*

The Ranco La Brea Wood Ibis. By Hildegarde Howard.—*Mycteria wetmorei* (p. 253), described from a fragment of a lower mandible with the end of a tarsus-metatarsus referred to the same species.

The Condor. XXXVII, No. 6. November–December, 1935.

Nesting of the Black Swift in Sequoia National Park. By Joseph S. Dixon.—The cut of the young bird appears to be printed upside down.

An ecological Study of Some Minnesota Marsh Hawks. By W. J. Breckenridge.

Parental Instincts in Black Phoebes. By Eric C. Kinsey.

Studies in Avian Color Reactions. By A. L. Pickens.—Colored paper flowers on Ruby-throated Hummingbird; and colored fluttering papers simulating insects on Ducks. In the former purple and red were the favorites and in the latter red seemed to predominate.

Notes on the Forms of *Spizella atrogularis*. By A. J. vanRossem.—True *atrogularis* is restricted to Mexico and the Arizona form is called *S. a. evura* Coues while *S. a. caurina* A. H. Miller from Contra Costa and Alameda Cos., Calif., is recognized.

The Wilson Bulletin. XLVII, No. 3. September, 1935. (Wilson Ornith. Club, T. C. Stephens, Morningside College, Sioux City, Iowa.)

Seasonal Sex Characters in Birds and their Hormonal Control. By Emil Witsch.—Involves studies of the effect of hormones of the thyroid and hypophysis glands upon coloration of the plumage; the Weaver Finch (*Pyromelana franciscana*) and its remarkable seasonal changes in plumage being the species experimented with.

Nesting of the Raven in Virginia. By F. M. Jones.

Observations on the Violet-green Swallow. By A. E. Shirling.

A Bird Census Method. By W. J. Breckenridge.—The observer made four trips across a square-mile area along equi-distant compass lines and counted the birds flushed, estimating the distance of each from the compass line. A north and south study was later checked by an east to west count.

Value of Field Observations in Economic Ornithology. By W. L. McAtee.

Additional Iowa Species of Birds Substantiated by Specimens. By P. A. Dumont.

The Birds of Fort Sisseton, South Dakota, A Sixty Year Comparison. By William Youngworth.—Dr. Chas. E. McChesney 1875–78 recorded 154 forms and to these the author is able to add 77.

The Oölogist. LII, No. 9. September, 1935. (R. M. Barnes, Lacon, Ill.)

Nests of the Eastern Sharp-tailed Sparrow. By Horace O. Green.

Whitney's Elf Owl. By W. C. Hanna.—Notes on nesting.

Owls of Anderson Co., Kansas. William Wells.

Bird Banding. VI, No. 4. October, 1935. (C. B. Floyd, 95 South St., Boston, Mass.)

Three Years of Eastern Bluebird Banding and Study. By T. E. Musselman.—Fifty boxes occupied in 1934 in the vicinity of Quincy, Illinois.

Survival as Indicated by Returns to Summerville, S. C. By Wm. P. Wharton.—White-throated and Chipping Sparrows and Red-eyed Vireos. Records covering eight years.

Blood Parasites of Birds and their Relation to Migratory and Other Habits of the Host. By R. D. Manwell and C. M. Herman.

The Nebraska Bird Review. III, No. 4. October, 1935. (Nebraska Ornith. Union, M. H. Swenk, 1410 N. 37th St., Lincoln, Nebraska.)

The Weights of 356 Nebraska Specimens of Geese of the *Branta canadensis* Group, formerly contained in the D. H. Talbot Collection. By Myron H. Swenk and Philip A. DuMont.

The 1935 Migration Season.

The Migrant. VI, No. 3. September, 1935. (Tennessee Ornith. Society, A. F. Ganier, 2507 Ashwood Ave., Nashville, Tenn.)

History of the Tennessee Ornithological Society. By A. F. Ganier and Others.

Many photographs of individuals and groups.

Annual Fall Field Day. By John Craig.

A Collection of Birds from Cooke Co., Tenn. By Wm. M. Walker.—Collection of N. F. Stokeley. *Nyroca marila*, *Crecisicus jamaicensis stoddardi* and *Catoptrophorus semipalmatus inornatus* are new birds to the Tennessee list.

The Gull. XVII, Nos. 6–9. June–September, 1935. (Mrs. A. B. Stephens, 1695 Filbert St., San Francisco, Calif.)

Accounts of the activities of the Audubon Society of the Pacific with articles on Black Swifts (July); Texas Night Hawk (Aug.) and Bohemian Waxwings (Sept.)

The Kentucky Warbler. XI, Nos. 3 and 4. July and October, 1935. (Published by the Kentucky Ornithological Society, Dr. Gordon Wilson, Bowling Green, Ky.)

Literature on the Birds of Kentucky. By B. C. Bacon and B. L. Monroe (July).

Birds of a Jefferson Co. Marsh. By B. L. Monroe (July).

Beginning of a very fully annotated list of the Birds of Kentucky. By Bacon and Monroe (Oct.).

The following are mimeographed journals with much interesting information about the birds and ornithologists of the regions of which they treat.

Inland Bird Banding News.—VII, No. 3. September, 1935. (Inland Bird-Banding Asso., Chicago Acad. Sci., Chicago, Ill.)

Banding Herring Gulls in Winter. By W. I. Lyon.

News from the Band Banders.—X, No. 3. August, 1935. (Western Bird Banding Asso. Mus. Vert. Zool., Berkeley, Calif.)

Long Island Bird Notes. A Weekly News Letter II, No. 39–48. October–November, 1935. (David E. Harrower, Woodmere Academy, Woodmere, N. Y.)

News Letter of the Audubon Society of Missouri.—II, No. 6. November, 1935. (S. L. O'Byrne, Rt. 5, Webster Grove, Mo.)

The Night Heron.—IV, No. 6–8. June–August, 1935. (J. O. Felker, 8 Fair Oaks, St. Louis Co., Mo.)

The Prothonotary. I, Nos. 7, 8 and 9. September to November, 1935. (Buffalo Ornithological Society, H. D. Mitchell, 378 Crescent Ave., Buffalo, N. Y.)

The Raven. VI, No. 9–10. September–October, 1935. (Virginia Ornithological Society, Dr. J. J. Murray, Lexington, Va.)

Autumn Days on White Top. By J. J. Murray.

The Redstart. II, Nos. 12 and III, No. 2. September and November, 1935. (Brooks Bird Club, Oglebay Park, Wheeling, W. Va., J. W. Handlan.)

Saint Louis Bird Club Bulletin. IV, No. 7. October, 1935. (Elliot Ave., St. Louis, Mo.)

Snowy Egret. X, No. 1. Autumn, 1935. (H. A. Olsen, Pippapass, Ky.)

The Ibis. V, No. 4. October, 1935. (Taylor and Francis, Red Lion Court, Fleet St., London, E. C. 4, England.)

The Birds of Northern Portugese East Africa, Part IX. By Jack Vincent.

The Races of *Larus argentatus* and *L. fuscus*. By Col. R. Meinertzhagen.—This is an endorsement of Herr Stegmann's paper (Jour. f. Ornith., 1934, 340) which we criticised (Auk, 1935, p. 36) on the grounds that one could not unite all of the races of these two "species" under one specific heading when no intergradation was shown. If we agree with Col. Meinertzhagen that "neither intergradation nor absence of intergradation are thought to be any criterion for defining a subspecies," then there is no more to be said. We had thought that that was the generally accepted criterion of a subspecies!

On a Collection of Birds from Danakil, Abyssinia. By W. Thesiger and M. Meynell.

The Birds of the Sierra de las Minas, Eastern Guatemala. By Ludlow Griscom.

Territory and Polygamy in a Bishop-bird (*Euplectes h. hordeacea*). By David Lack.—Each male takes on a succession of females one at a time and there may be three females with nests in the territory simultaneously. The female takes no cognizance of territory nor is it of food value. Its value seems to be to afford isola-

tion for the males and so to assist the females to secure mates. The display of bright plumage is correlated with territory not courtship and may take the place of song as used by other species. A valuable study especially as it is one of the first to deal with territory in tropical birds.

The Birds of Jan Mayen Island. By C. G. and E. G. Bird.

Observations on the Birds of Newfoundland during the 1934 Expedition of the Public Schools Exploring Society. By K. B. Rooke.

Bulletin of the British Ornithologists' Club. No. CCLXXXIX. November 4, 1935. (C. H. B. Grant, 58a Ennismore Gardens, Princes Gate, S. W. 7. London, England.)

G. L. Bates describes *Ammomanes deserti hijazensis* (p. 8) and W. L. Sclater and R. E. Moreau six new forms from Tanganyika on an expedition which was described by the former.

British Birds. XXIX, No. 4. September, 1935. (H. F. Witherby, 326 High Holborn, London, England.)

The Courtship of the Red-backed Shrike and the Woodchat. By F. C. R. Jourdain.

The Index of Heron Population, 1935. By E. M. Nicholson.

Color of the Bill and Other Notes on the Twite. By Fred Taylor.

Movements of Manx Shearwaters. By R. M. Lockley.

British Birds. XXIX, No. 5. October, 1935.

On the Nidification of the Lesser Redpoll. By R. E. Windsor.

Notes on Birds in Ireland from 1930 to 1934.

Movements of Ringed Birds from Abroad to the British Isles and from the British Isles Abroad. By H. F. Witherby and E. P. Leach.

British Birds. XXIX, No. 6. November, 1935.

Notes on Population Problems and Territorial Habits of Chaffinches and Willow-Warblers. By M. Philips Price.

The Orielton Decoy, Past and Present. By C. W. Mackworth-Pread and H. A. Gilbert.—An artificial lake where many Ducks were caught and of late years banded. The captures from 1877 to 1919 numbered 42000 wild fowl.

The Avicultural Magazine. (IV series) XIII, Nos. 9, 10, 11. September–November, 1935. (The Avicultural Society, Miss Knobel, 86 Regent's Park, London, N. W. 1.)

There is a colored plate of *Anthreptes collaris elachior* in Oct. and in the same number an interesting series of Duck-breeding records including many hybrids. By E. Hopkinson. Also abundant information on aviaries and bird keeping.

The Oologists' Record. XV, No. 3. September, 1935. (Harrison & Sons, 45 St. Martin's Lane, London, W. C. 2, England.)

Week End in Guiana. By C. F. B.

Eggs of the Wattled Crane. By C. R. S. Pitman and F. C. R. Jourdain.

Bird Notes and News. XVI, No. 7. Autumn, 1935. (Royal Soc. for the Protection of Birds, 82 Victoria St. London, S. W. 1, England.)

Some Birds of the British West Indies. By J. B. Watson.

The Emu. XXXV, No. 2. October 1935. (Royal Australian Ornith Union, 168 Latrobe St., Melbourne, Australia.)

The Two Red-throated Whistlers (*Pachycephala*). By F. E. Parsons and J. N. McGilp.—With two colored plates.

Birds and Grasshoppers. By J. N. McGilp.—In the great flights of grasshoppers the birds that are able to do the most good are those which devour the young insects before they are able to fly and the Wood Swallows and Crows proved to be the most efficient. Curiously enough no Plovers or Quail were observed to eat the larvae.

Notes on the White-throated Nightjar. By A. J. Elliott.

Birds of the Mallee National Park. By A. H. Chisholm.

Two Trips into the Hinterland of Nelson Province, New Zealand. By Mrs. Perrine Moncrieff.

The Food of Australian Birds. Part III. By A. H. Lea and J. T. Gray.

L'Oiseau. V, No. 3–4. 1935. (M. A. Labitte, 69 Rue dela Convention, Paris, XVe, France.) [In French.]

A Study of the Genus Amandava. By J. Delacour.

Ornithological Notes on a journey through Malaysia. By J. Berlioz.

Systema Avium Rossicarum (continued). By G. P. Dementiev.

The Ornithology of Lower Brittany. By E. Lebeurier and J. Rapine.

Variation in the Plumage and Form of Birds. By M. Legendre.

Visible Manifestation of Sexual Development in Birds. By G. R. Mountfort.

Notes on the Avifauna of the Balearic and Pityusae Isles. By E. L. Bernath.

Notes on Birds of Paradise in Captivity. By J. Delacour.

Osseous Tumors in Birds. By R. Salgues.

Alauda. (Ser. III) VII, No. 3. July–September, 1935. (Dr. E. Beraut, 97 Rue de Vaugirard, Paris.) [In French.]

Notes on *Tetrao urogallus*. By R. Hainard and O. Meylan.

The Pigeons of the Genus Alectroenas. By Snouckaert van Schauburg.

A Contribution to the Ornithology of Western Thian-Chan. By E. Spangenberg and G. Dementiev.

On the Vocal Performances of Cettia c. cetti. By L. Trouche.

A Contribution to a Study of the Food of Aquatic Birds. By Paul Madon.

Le Gerfaut. XXV, Fasc. 2. (Square Prince Charles, 21, Bruxelles-Laeken, Belgium.) [In French.]

Almost entirely devoted to bird banding records for Belgium.

Journal für Ornithologie. 83 Jahrgang, Heft 4. October, 1935. [In German.][1]

Observations on the Nest of the Least Bittern (*Ixobrychus m. minutus*). By Franz Groebbels.

On the Breeding Habits of Brazilian Birds. By the late Dr. Emile Snethlage.—Conclusion; covering 125 species.

Mites from the Nostrils of Birds. By H. Graf Vitzthum.—Many new species and one new genus are described. As a matter of nomenclature it is interesting to note that the author recognizes *Sternostomum* and *Sternostoma* as different names and makes use of both. This is "one-letterism" with a vengeance!

The Numerical Variation and Present Status of the White Stork in Schleswig Holstein. By Walther Emeis.

Fifty-third Annual Meeting of the German Ornithological Society.—In Munich.

Ornithologische Monatsberichte. 43 Jahrgang, No. 5. September–October, 1935. [In German.]

Observations on *Dryobates leucotos* and *Picoides tridactylus alpinus* in the Bavarian Forest. By J. Verthein.

Are Ants of Use to Birds for Plumage cleaning. By various contributors.

On the Anatomy of *Micropsitta*. By George Steinbacher.

Migration of *Motacilla flava thunbergi* through Saxony. By Heinrich Dathe.

New Bird Subspecies from Malaysia. By F. N. Chasen.—Five new forms of *Chotorhea, Terpsiphone, Cettia* and *Pycnonotus*.

Der Vogelzug. 6 Jahrgang, No. 4. October, 1935. [In German.]

On the ratio of Age and Sex in the Autumn and Spring Flights. By R. Drost.

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[1] German Journals from: R. Friedländer & Sohn, Berlin N. W. 7, Karlstr. II.

On the Migration of the Fish Hawk (*Pandion haliaetus*). By W. Banzhaf.

Observations on a Sleeping Place of Winter Crows. By G. Wachsmuth.

Homing Experiments with Winter Birds. By Alfred Hilprecht.—Returns of individuals of various species removed to distances of 200 to 470 kilometers in different directions.

Vogelring. 7 Jahrgang, No. 1–2. 1935. [In German.]

Stork Banding in 1935. By H. Wiegand.

And many other short papers on bird banding in Germany.

Beitrage zur Fortpflanzungsbiologie der Vogel. Jahrgang 11, No. 5. September, 1935. [In German.]

The Draining of the Oldenburg Marshes and its Effect upon the Composition of the Bird Population. By Walther Emeis.

On the Nest Holes of the Black Woodpecker. By A. Viebig.

The Breeding Life of the Red Kite. By G. Thiede and A. Zankert.—With excellent plates.

The Eyrie of *Butaster liventer* of Java. By August Spenemann.

An Ornithological Study Trip to East Prussia. By L. von Kalitsch.

Beitrage zur Fortpflanzungsbiologie der Vogel. Jahrgang 11, No. 6. November, 1935. [In German.]

The Cliff-breeders of the Sandstone Mountains of the Elbe. By G. Creutz.

Some Examples of Alteration in Bird Songs. By E. Christoleit.—A discussion of Braun's statement "that many of the bird songs that our grandfathers heard are already vanished."

The Ecology and Biology of *Turdus ruficollis* and *T. atrogularis*. By Von H. Grote.

Der Ornithologische Beobachter. Jahrgang 32, Heft 11 and 12; Jahr. 33, Heft 1 and 2. August–November, 1935. [In German.]

The Terragraph and Barn Owls. By J. Bussmann.—A registering device at the entrance to the nest recorded visits which are tabulated with regard to rising and setting of the moon and sun. A food analysis for one night for two pairs of birds showed 69 mice and shrews and one bird, a Titmouse. (August).

Wild Ducks as "Guest Birds" in Switzerland. By U. A. Corti. (Sept.)

The Gannet. By Julie Achinz.—With map of British breeding colonies.

Aquila. 1931–1934. XXXVIII–XLI. [In Hungarian and German.]

Bird Conservation Studies 1931–1934. By Dr. Titus Csorgey.

Bird Banding by the Royal Hungarian Institute in 1931–1932. By Jakob Schenk.

Our Knowledge of *Anser fabalis*. By H. Grote.—With a systematic review of the races. There is another article on the same subject by Dr. E. Nagy.

The above are a few of the more important articles in this bulky volume which contains many shorter contributions to the ornithology of Hungary.

Ardea. XXIV, Afl. 1–2. August, 1935. [In Dutch.] (E. J. Brill, Leyden.)

Field Observations of East Greenland Birds. By N. Tinbergen. [In English.] I.

The Behavior of the Red-necked Phalarope in Spring.—This is one of the most important contributions to the behavior of *Phalaropus lobatus* that has yet appeared, covering courtship, territory, stimulating actions, functions of the sexes, discrimnation of sex, etc. There are many excellent photographic illustrations.

There are also detailed accounts of the nesting behavior of *Accipiter n. nisus* by L. Tinbergen and of *Vanellus vanellus* by A. Daanje, and an extended study of a Starling colony by H. N. Kluijver which discusses sexual dimorphism, territory, etc.

Bird banding reports and migration records from several stations in the Netherlands are presented.

Organ of the Netherlands Ornithological Club. VIII, No. 1. September, 1935. [In Dutch.] (N. V. Nauta & Co., Zutphen, Holland.)

Bird Banding in the Netherlands. By M. J. Tekke.—Nineteen stations.

There are several other articles on bird banding and notes on the breeding and occurrence of birds in the Netherlands.

Nesting habits of *Halcyon chloris cyanescens* in West Borneo. By L. C. deRuiter.

Ornis Fennica. XII, Nos. 1 and 2. April and May, 1935. [In Finnish.]

The Avifauna of the Cultivated Lands of Aland, Finland. By P. Palmgren. (April.)

The Relative Abundance of Owls in southeastern Finland. By T. A. Putkonen. (May.)

The Relation of the Intensity of the Migratory Impulse in Cage Birds to the State of the Weather. By H. Alqvist and P. Palmgren.—With another paper by the latter on an instrument to record the intensity of this impulse.

Several local papers.

Danske-Fugle. IV, No. 31. 1935. [In Danish.] (P. Skorgaard, Viborg, Denmark.)

Local lists of Danish birds and records of bird banding. There is also a map of the census of Stork nests in Denmark and some excellent photographs of nests of the honey Buzzard (*Pernis apivorus.*).

Norsk Ornithologisk Tidsskrift. Nos. XIV and XV. 1931–1934. [In Norwegian.] (Stavanger Museum, Stavanger, Norway.)

Nesting of *Charadrius hiaticula* and *C. dubius curonicus.* By Kare Oftedal.—With beautiful illustrations.

Ornithological Observations in Bygland, 1932–34. By Yngvar Hagen.—Contains a detailed account of the food and the development of the Little Owl (*Aegdius funereus*) and the Kestral (*Falco tinnunculus*) with excellent photographs.

There are numerous local notes including a record of the Flamingo for Norway, and bird banding summaries.

Ceskloveńsky Ornitholog. 1935. Nos. 4 and 5. [In Hungarian.]

Many local notes and lists with a number of photographs of birds and nests.

CORRESPONDENCE.

Editor of 'The Auk':

I believe that no student of bird behavior can afford to overlook Dr. Herbert Friedmann's interesting paper on 'The Instinctive Emotions of Birds,' but its author would, I am sure, be the last man to claim that it said the last work on the subject. On reading it shortly after its publication I felt that, in spite of its penetration and its general soundness, it raised some questions that needed discussion. I was particularly glad, therefore, to see Mr. Swarth's letter in the July 'Auk' on the significance of what is known as 'injury-feigning' among birds, and I am moved to continue the discussion, if I may, using some observations and arguments that I have already communicated to Dr. Friedmann. I agree with Mr. Swarth that the evidence seems to show that this type of behavior has a definite purpose and a survival value and that, however it may have arisen in the first place, it is not now a matter of a struggle between two emotions. Let me take the case of the Killdeer first, a case with which I am personally familiar.

When the Killdeer flutters away from an intruder in an apparently helpless condition, that is not the end of the affair. She (or he, for both sexes react in this way) returns again and again as long as the intruder remains in the neighborhood of her charges, with what certainly appears to be the purpose—though the unconscious purpose—of decoying him away. The return is not to the nest or young, but *towards the intruder*, wherever he may be, so long as he remains in what the bird appears to regard as the danger zone. If she were terror-stricken, surely she would keep away from the enemy, once she got off, and would simply seek a chance to sneak back to her charges.

Moreover, the behavior, as I have seen it, has a rather definite pattern. The bird lies on her belly with both wings fluttering and turned front edge down, sometimes rolling over somewhat to one side and fluttering only one wing. When both wings are fluttered, the bird looks at a distance as if it were lying helpless on its back. This is partly because of the angle at which the wings are held and partly because the upper tail-coverts are raised and fluffed out, showing a great deal of whitish about the base of the tail strongly suggestive of the white of the bird's belly. All this is accompanied by a rolling chatter of short low-pitched notes which are not, I think, used on other occasions. When I first saw this performance to good advantage, I was completely fooled for a time and really thought the bird was on its back. It would obviously be of use to the bird thus to deceive its enemies, whereas actually to turn over on its back would make a get-away difficult.

Mr. Swarth raises some other questions that are worth considering. First, as to the kinds of birds that practice this so-called injury feigning. He mentions Doves and Plovers as within his own experience. He says he cannot recall having seen any Grouse or Quail practice it. The behavior of the Ruffed Grouse in the presence of an intruder is, however, sometimes interpreted as injury-feigning. Forbush so describes it in his 'Birds of Massachusetts,' and Brewster in 'Birds of the Umbagog Region' speaks of this species as fluttering away before a dog instead of bustling up to it as it usually does to a man, and this certainly suggests acting the cripple. I judge that the Doves that Mr. Swarth has seen feigning injury are ground-nesting species, and this suggests the inquiry whether this habit is not confined to ground-nesting birds. So far as my information goes, this is the case.

And this is perhaps what might be expected. This reaction, I should suppose, would be of value only as a protection against prowling mammals. A bird of prey

attacking from above would have too great an advantage over a slow-moving bird on the ground to encourage the development of such a habit. Moreover, birds nesting in trees are usually well hidden from passing Hawks, which, so far as I know, never make a practice of nest-hunting; while the real nest-hunting birds, such as the Crows and the Jays, confine their attentions to the eggs and young and would never be beguiled into chasing a full-grown bird, however crippled it might appear to be. Again, of the tree-haunting mammals, the squirrels have no interest in full-grown birds as prey, and the weasels and martens are hardly equipped for chasing birds in the branches. Similarly, the snakes that prey upon the eggs and helpless young would not be beguiled into following adult birds.

Thus the conditions would seem to indicate a confinement of the injury-feigning reaction to ground-nesting birds—if, as we are supposing, the habit has been developed because of its usefulness to the birds. If, on the other hand, it is a mere matter of conflicting emotions, why should it not be shared by the tree-nesting species, which are just as devoted to their eggs and young and are equally subject to the emotion of fear?

Mr. Swarth notes that Gulls, Terns, Frigate-Birds, and Boobies do not practice injury-feigning. There may be more than one reason for this, but it would seem that a sufficient one would be the fact that these birds nest near together in colonies, where no bird could toll off an intruder without invading the nest-territories of others of the species—which would never be permitted by the neighbors!

Other ground-nesting birds not mentioned by Mr. Swarth that practice injury-feigning are certain Ducks, the Woodcock, the Whip-poor-will, the Nighthawk, and some species of Passerine birds. Of the last, without attempting an exhaustive search of the literature, I find the habit attributed to the following in Forbush's 'Birds of Massachusetts': Prairie Horned Lark, Black and White Warbler, Oven-bird, Louisiana Water-Thrush, Red-eyed Towhee, Savannah Sparrow, Grasshopper Sparrow, and Vesper Sparrow.

I have no pertinent notes of my own on any of these except the Black Duck. I have seen Black Ducks with broods of young flap off over the surface of the water with the very evident design (on the part of Nature) of decoying possible enemies out of the way. On one such occasion the mother bird led me a quarter of a mile up the river before she left me and returned to her brood of eleven quarter-grown ducklings. Toward the end of the performance she flew in the air short distances, then tumbled in again each time and flapped quacking over the surface as if she had decided after all to continue the ruse a little longer. I do not see how this could be a case of emotional conflict.

It will be seen that none of the ground-nesting birds that I have instanced nest in thick cover, such as high grass, reeds, cat-tails, or underbrush. And this is to be expected, because the ruse could not be worked to advantage where the bird cannot be easily seen and followed. Here, therefore, we have another restriction on the development of this habit.

In the case of the Ducks it may be found that some species that do not nest on the ground but that lead their broods off into the open water practice injury-feigning, but of this I have as yet no information. Among the Passerines, Herrick in his 'Home Life of Wild Birds' (pages 131, 132) cites a case of it in the Chestnut-sided Warbler, a bird that nests not on the ground but near it; and it may be found that the habit is extended to other species not actually nesting on the ground, though Herrick's case is the only one I have yet come across.

May we not now make a few tentative generalizations to the following effect?

1. The behavior commonly known as injury-feigning is a response that has been perpetuated in certain species of birds because of its usefulness to the species by decoying predators away from nest and young.

2. It is to be expected from ground-nesting birds that do not nest in colonies nor in thick cover, and in some cases from birds nesting near the ground in situations subject to attack by roving mammals and at the same time affording opportunity for the use of the ruse.

3. It is not to be expected from tree-nesting birds nor from colonial nesters nor from birds that nest in thick cover.

As to how the habit arose, it may be that Dr. Friedmann's suggestion of a conflict between fear and devotion to offspring is the answer, but that this reaction would not be perpetuated by natural selection unless it proved to be of real use to the species.

Of course, all I have said is only tentative. I do not pretend to have made a really thorough study of the subject, and it is clear, I think, that both Dr. Friedmann and Mr. Swarth have given only their personal impressions. I am sure they will both agree with me that more evidence and further discussion are desirable.

FRANCIS H. ALLEN

West Roxbury, Mass.
August 15, 1935.

P. S.—Since sending you this letter I have read a copy of it to the Nuttall Ornithological Club and have had my attention called to a few exceptions to the 'tentative generalizations' set forth above. I do not think they invalidate these generalizations, which after all were not formulated as invariable rules, but they do go to show that much more investigation is needed if we are to get to the bottom of this interesting subject.

The most important of these exceptions are three tree-nesting birds that practice injury-feigning on occasion. These are the Mourning Dove and the Long-eared and Great Horned Owls. Though in the case of these three species the ruse is not practiced invariably, it is not clear why it should exist at all. Perhaps there are ancestral reasons for its development among them. In the case of the Owls, it is hard to see why their very efficient weapons of offense and defense should not be adequate protection for the young, except against other Owls. Perhaps the well-known rapacity of such species as the Great Horned Owl, which has been known to pray upon smaller Owls from the Barred Owl down, is responsible for the injury-feigning habit in the Long-eared Owl and possibly even in its own species. It is conceivable, too, that the Mourning Dove may have acquired the habit as a protection against Owls. It is interesting to note that in all these three species the bird drops to the ground to practice its maneuvers, and of course they would be much more effective there than among the branches.

If some species of tree-nesting Owls practice injury-feigning at times, one would expect the habit to be universal with the ground-nesting members of the family, but such is not the case. The Short-eared Owl sometimes practices it, but, as I judge from the literature, more generally does not. The fact that the nest is sometimes placed in rather thick cover and is sometimes in the open may have some bearing on this variance of habit.

F. H. A.

November 23, 1935.

OBITUARIES.

HARRY SCHELWALD SWARTH, a member of the American Ornithologists' Union for 35 years and a Fellow since 1916, died suddenly at Berkeley, Calif., October 22, 1935. He was born in Chicago, January 26, 1878, and was a graduate of the high school in that city. Entering museum work at the age of 27, he enjoyed unusual opportunities for studying birds in the laboratory and in the field. During the last three decades he was associated with four museums, the Field Museum in Chicago, the Museum of Vertebrate Zoology in Berkeley, Calif., the Museum of History, Art, and Science in Los Angeles, and during the last eight years the California Academy of Sciences in San Francisco. From 1923 to 1935 he was Inspector of Foreign Birds for the U. S. Department of Argiculture at the port of San Francisco, and thus had an opportunity of seeing in life many species from the Orient and from Central and South America. In connection with his museum work he had frequent opportunities of making collecting trips and visited many localities in California, Arizona, British Columbia, and Alaska, and also the Galapagos Islands.

Swarth's publications are numerous and important, including reports on several of his field expeditions, a list of the birds of Arizona, a comprehensive account of the birds of the Galapagos. a revision of the Fox Sparrows, and a history of the Cooper Ornithological Club. Meticulously careful in his work, a born bibliographer. Swarth was specially equipped for editorial and bibliographical work. He was Editor of the last 10-year 'Index of the Auk' and had begun collecting material for the index covering the present decade.

In accordance with custom, one of the Fellows of the Union will be appointed to prepare a Memorial of his work to be presented at the next meeting of the Union.—T. S. P.

HENRY SMITH OSLER, K.C., an Associate of the American Ornithologists' Union, elected in 1920, died in Montreal, P. Q., Dec. 8, 1933, at the age of 71. He was born in Toronto, Ontario, Nov. 8, 1862, and was the eldest son of Featherston Osler, a justice of the Court of Appeal for Ontario. His father was one of the famous quartet of brothers, including the late Sir William Osler, M.D., Sir Edmund Osler and B. B. Osler, K.C., considered in his time Canada's greatest criminal lawyer.

H. S. Osler was educated at Dr. Tassie's school at Galt and the University of Toronto. After graduating from the law school at Osgoode Hall, he was called to the bar in 1886 and began practice under his uncle, B. B. Osler. He restricted his energies chiefly to a consulting practice and established wide connections as a corporation counsel. In 1903 he was made a K.C. In 1925 he came into prominence in connection with the Teapot Dome Investigation, but efforts to prosecute him for contempt of court for not answering certain questions failed when the Ontario Court of Appeal held that he was not obliged to answer questions of a confidential nature arising from the relations between lawyer and client.

Mr. Osler was very modest and retiring, avoided publicity, and published little even on the subjects in which he was most interested. He was an expert revolver shot, an excellent billiard player, a lover of horses and dogs and an authority on art. His chief hobby was hunting, and in 1906 he served as Chairman of the Board of Game Commissioners of Ontario. He made several trips to Africa, ascended the

Nile and brought back valuable collections, some of which, including a series of 181 Sudanese birds, are now in the Royal Ontario Museum of Zoology.

In 1918 he began banding birds under the American Bird Banding Association and developed original and effective methods of trapping, which enabled him to make important contributions to the subject. Two years later at his shooting preserve at Lake Scugog he banded 206 ducks of four species which added much to the knowledge of the waterfowl breeding and passing through that point (See F. C. Lincoln in 'The Auk,' 1922, pp. 328–334). This work continued until 1926, but was then suspended as his later years were spent in France. It is unfortunate that modesty or dislike of publicity prevented him from publishing the results of his experiences as bird bander, sportsman, and traveler, as they might have added much to cur knowledge of some of the species which came under his observation.

For the facts on which this notice are based thanks are due to J. L. Baillie, Jr., of the Royal Ontario Museum.—T. S. P.

ARCHIBALD THORBURN. While not a member of the A. O. U. Mr. Thorburn was widely known to American ornithologists through his superb paintings of birds and his death on October 9, 1935, in his seventy-sixth year, will be deeply regretted by all lovers of birds. He stood by general consent at the head of the bird artists of the world, our own lamented Fuertes being the only one who could claim equality at any time. Thorburn's work was perhaps best known in this country by his contributions to Beebe's 'Monograph of the Pheasants' and his own splendid 'British Birds.' He inherited his gift since his father Robert Thorburn ARA was a miniature painter of note and gave him instruction in painting but his knowledge of birds and his ability to depict them to the life were all his own and cannot, unfortunately, be passed on.

Ornithologists will regret to learn of the death of THOMAS LEROY HANKINSON, on December 3, 1935, at his home in Ypsilanti, Michigan in his 60th year. He was born at Valparaiso, Ind., April 12, 1876.

Professor Hankinson divided his scientific interests between birds and fishes, but ornithology was his first love, and he never lost his keen interest in it nor ceased to study it. He was fortunate in being associated early with Professor Walter B. Barrows, under whom he worked until his graduation from the Michigan Agricultural College in 1898. He received his bachelor's degree from Cornell, and taught successively in the Eastern Illinois Normal College, Charleston, Illinois; as Research Professor of Ichthyology at the New York State College of Forestry, Syracuse, New York; and as Professor of Zoology at the Michigan State Normal College, Ypsilanti, Michigan, since 1921.

He was a member of the Wilson Ornithological Club since 1911, and president of the Club in 1922 and 1923; associate member of the American Ornithologists Union since 1897; and an officer on the executive board of the Michigan Audubon Society since 1922. He published about a dozen ornithological papers in the 'Bulletin of the Michigan Ornithological Club,' 'The Auk,' and 'Bird-Lore.'—GENEVA SMITHE, *University Museums, Ann Arbor, Michigan.*

NOTES AND NEWS.

THE RESIGNATION "for personal reasons" of J. N. Darling as Chief of the Biological Survey will be deeply regretted by all interested in the conservation of wild life. Although his tenure of the office was short he accomplished a tremendous amount of work and brought conservation of wild life before the public in a way that had never been done before. Especially has he done a great service in demonstrating the multiplicity of agencies working under the Government for the same objective and frequently working at cross purposes, while other agencies with different objectives are in direct conflict with them. We are at least informed as to the almost impossibility of accomplishing certain results in conservation through Government agencies as now set up, but as to how to remedy existing conditions no one apparently knows.

It will at least be a satisfaction to all to realize that Mr. Darling is now again where he was before he took over his Governmental position and can continue with his excellent efforts through the public press in behalf of wild life "from the outside." Sometimes cartoons are the most effective means to accomplish reform and we wish him all success and the much needed rest that he so greatly deserves, while appreciating deeply the personal sacrifices that he has made in behalf of wild life in the past two years.

To his successor, Mr. Ira N. Gablielson, some of whose earliest papers appeared in 'The Auk,' we tender best wishes for success in the difficult work that lies before him.

WE LEARN from Mr. W. B. Alexander, of Oxford University Museum, England, that Rev. J. M. McWilliams of Glasgow has in his possession a portrait of Alexander Wilson "almost certainly the original of the engraved frontispiece of Jameson's Edinburgh edition of the American Ornithology of 1831." The portrait is for sale and Mr. Alexander will be glad to furnish any further information regarding it.

THE FOLLOWING announcement is presented at the request of Mr. Bent for the information of those who have been helping in gathering information for his 'Life Histories of North American Birds':

So many inquiries have come to the author as to when the next volume of 'Life Histories' is likely to appear, that it seems desirable to explain to former contributors the present status of the work.

Since Bulletin 162 on Gallinaceous Birds was published, the manuscripts for two volumes on Birds of Prey have been prepared, covering all the birds from the Vultures to the Owls inclusive in the order of the old 'Check-list.' These volumes have not been published for lack of the necessary money, drastic economies in the regular governmental appropriations having required the elimination of such funds. While there is no immediate prospect of their publication it is our hope that one at least may appear next year.

In the meantime, the author is at work on still another volume, the twelfth, which will cover all the birds in the old 'Check-list' arrangement from the Parrots to the Hummingbirds inclusive.

Although some material has already come in on some of these groups, the author realizes that former contributors have not been advised as to what groups would be taken up next so that they have not sent in as much material as they might have done.

The author is ready now to receive contributions of notes on habits, and photographs, relating to any birds in the groups indicated above. Notes relating merely

to distribution or migration should be sent to the Biological Survey, where this part of the work is handled.

The assistance of our many contributors in the preparation of earlier volumes has been invaluable and I ask that it be continued. Those who send in material suitable for use in the work will have their names placed on the mailing list to receive future volumes.

Sincerely yours,
ARTHUR CLEVELAND BENT,
Taunton, Mass.

FOR THE benefit of those ornithologists and mammalogists who are interested in the systematic zoology of Africa we reprint what will probably prove a rather rare leaflet in our libraries. It was privately printed and the edition is apparently limited. It is reprinted verbatim et litteratim!

DESCRIPTION OF NEW RACES OF KALAHARI BIRDS AND MAMMALS BY R. D. BRADFIELD.

Lophoceros Monteri Marjoriae; subspecies Nova; paler than L. M. Monteri of Benguella. The secondary flight feathers and tail more white. The typical form extends to Waterberg, its place at Quickborn, Windhoek and Karabib being taken by above. Type male taken by me at Quickborn, 25/8/1922, and presented to Pretoria Museum.

Micropus Melba Majoriae. The whole upper surface and chest bar paler than M. M. Africanus. Subspecies nova, type male taken by me at Quickborn, 2/10/24, and presented to Pretoria Museum. This form is resident in Damaraland throughout the year and nests in numbers in the Waterberg Krantzes.

Namibornis; genus novelty. Type Bradornis Herero. De Schawensee. This genus differs from Bradornis in its more curved bill, in the colour of its rump and tail and its rock dwelling habit. It is closely related to Cossypha Dichora, it is a noisy bird, its three note call is hardly distinguishable from that of Dichora.

Its appearance at 30 yards and its habit of shaking its wings on alighting make it difficult to identify it from the Familiar Chat. I collected two, a female and a young one, the latter like a young robin, at Chaos Mountains, 3/4/33, and presented them to the Albany Museum.

Petromys Typicus Marjoriae. Subspecies novelty differing from P. T. Tropicalis in its exceptionally pale sandy colour, tail hardly darkened and pale feet. Type male taken by me at Khan River, January, 1931, and presented to Pretoria Museum, mentioned in Captain Shortridge's book, "Mammals of South West Africa," page 330.

Suricata Marjoriae. Species novelty. Differs from S. S. Hahni by its small size, forehead unmarked, body paler, undersurface dirty white. Type male captured at Saltpan, 10 miles north of Swakopmund, and now in possession of A. Stickel, at Swakopmund.

Stickel owned a pair of mierkats from Windhoek, they reared a batch of young which he sold, the male then died and was replaced by the type. The type has tried to mate with the female but she will not have anything to do with him. Though adult, he is only half her bulk. This species is mentioned in Shortridge's book, page 146.

Cerpithecus Aethiops Marjoriae. Subspecies nova differs from C. A. Pygerthrus by its general paler shade of colour. Type adult female taken by me at Zoetvlei, near

Kuruman, in January, 1932, and presented to Pretoria Museum with a young male. The type, when shot, I found had a large young one clinging to her, which I released.

This paper was due to be printed many months ago and was to form part of Vol. VII of "The Journal of The South West African Scientific Society," of which I am a member. It will appear when that volume is printed.

R. D. BRADFIELD,

Benoni,

26th September, 1935.

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